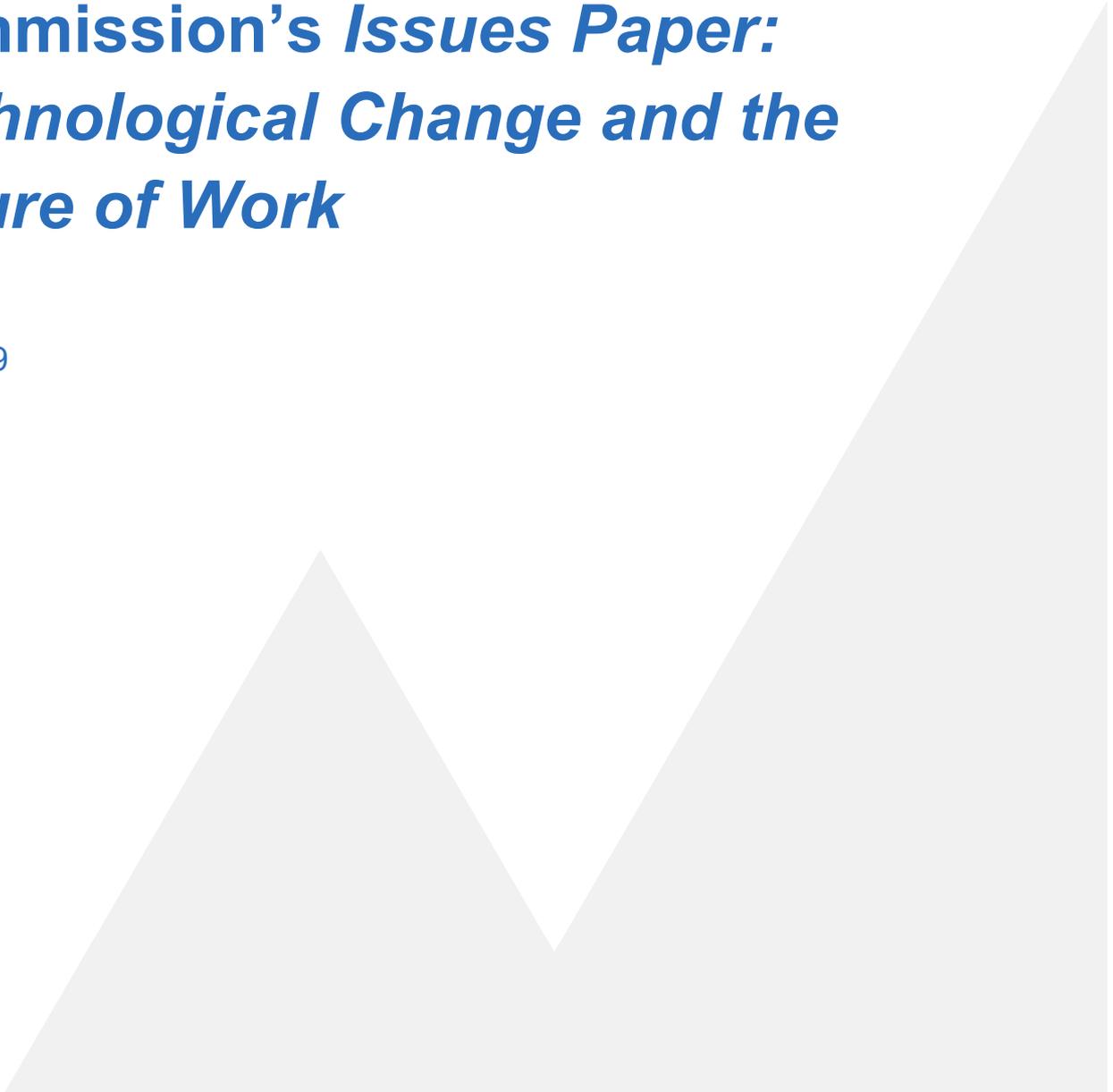




# Submission from the Ministry of Education on the Productivity Commission's *Issues Paper: Technological Change and the Future of Work*

July 2019



## Submission from the Ministry of Education on the Productivity Commission's Issues Paper: Technological Change and the Future of Work

### Introduction

1. The Ministry of Education is the New Zealand Government's lead advisor on the education system. Its purpose is to shape an education system that delivers equitable and excellent outcomes. The Ministry welcomes the opportunity to contribute to the Productivity Commission's inquiry into technological change and the future of work (the inquiry).
2. Technological change presents the education system with opportunities and challenges in terms of the outcomes the system needs to deliver and also as a user of technology. New Zealand needs the technical and innovation skills to be able to compete internationally and cope with rapid change. New entrants to the workforce need the right foundations, and those in the workforce need to be able to progressively update their skills. As noted in *Growing innovative industries in New Zealand: From the knowledge wave to the digital age*, workers with lower levels of education are particularly at risk of their jobs being automated and they may need to develop new skills to stay employable.<sup>1</sup>
3. Learners need solid foundational skills, including 'functional' literacy and numeracy, if they are to be employable and confident and capable of planning careers, engaging in formal qualifications and undertaking self-directed learning. Digital literacy (in the sense of technical skills), information literacy (such as critical thinking about information), and social-emotional literacy (such as interpersonal skills and self-awareness) are also increasingly important. We need fresh approaches if we are to achieve step-change improvements in outcomes in these various skill categories. Digital technology will be part of many of these approaches.
4. Technology can be a powerful catalyst for new forms of educational delivery, enabling resources such as teaching time, funding, learning support, and physical infrastructure to be targeted to need. Technologies can give students greater agency and expanded choice in their education, better support the role of educators, and collapse traditional institutional boundaries. The analysis and pursuit of these opportunities is guided by the cross-agency Education System Digital Strategy: *Transforming Education for the Digital Age 2015-2020* (attached).
5. In 2015, 11 education agencies and organisations endorsed the digital strategy; which has guided decision-making and investment for the education agencies. It provides an agreed set of understandings, focusing on enabling the potential of technologies. The Strategy was developed in partnership with: CareersNZ (now with the Tertiary Education Commission), Education Council of Aotearoa New Zealand (now Teaching Council of Aotearoa New Zealand), Education Payroll, Education Review Office, Ministry of Education, Network for Learning, New Zealand Qualifications Authority, Research and Education Advanced Network New Zealand, the Kura, and the Tertiary Education Commission (TEC).

### Our approach to this submission

6. Our intention in this submission is to highlight some current efforts to respond to these opportunities and challenges, and to provide further information relevant to the inquiry. We also raise some further issues and questions the Commission may wish to explore.
7. We begin by outlining the performance of the education and training system based on broad measures of outcomes. We then describe some current efforts to ensure that people entering the workforce have the foundation skills they need to succeed as active participants in work and education, to support those who didn't attain these skills at school, and to enable those in the workforce to re-skill and upskill throughout their careers. We take a look at evidence of digital divides and measures to address them. Finally, we touch on careers services, the implications of changing employment relationships for

---

<sup>1</sup> *From the Knowledge Wave to the Digital Age: Mai I tea o mātauranga kit e ao matihiko nei*, Ministry of Business, Innovation and Employment, 2019: [www.mbie.govt.nz/business-and-employment/economic-development/industry-policy](http://www.mbie.govt.nz/business-and-employment/economic-development/industry-policy).

education and training, and some ways the education system facilitates international connections for New Zealand firms.

### The performance of the education and skills systems

8. The issues paper asks a number of questions about the performance of the education and skills systems. These cover how well educational outcomes position New Zealand to respond to technology change (question 17), how well equipped the system is to support people to adapt to change throughout their careers (question 26), what underpins poor skills matching (question 22), and the education and training system's responsiveness to changing skills needs (question 24).
9. The issues paper also asks what measures are needed to improve skills among adults with low proficiency (question 19), what programmes support people to retrain, upskill or adapt to changing technology (question 25), and what policy options there are to improve matching in the New Zealand labour market.
10. We see these questions as inter-related. We start with some broad measures of system performance, then consider the support available to learners at different stages in their life-course, and current efforts to improve their outcomes.

### Broad measures of the system's performance

11. The Ministry administers the Survey of Adult Skills in New Zealand. The survey is part of the OECD's Programme for the International Assessment of Adult Competencies (PIAAC). The Survey of Adult Skills can help answer key questions related to skills in New Zealanders aged 16 to 65, such as:
  - what are the characteristics of the most skilled and least skilled people in New Zealand in terms of education, employment, income, well-being and other characteristics?
  - how do New Zealanders use their skills at work and at home?
  - what areas should we focus on to improve the skills of New Zealand adults? <sup>2</sup>
12. New Zealand adults' literacy and problem solving skills are, on average, among the highest in the OECD, and their numeracy skills are on average higher than the OECD average. The 2014 survey found that 45% of New Zealand adults had moderate to high skills in problem solving in technology rich environments – higher than any other OECD country including Australia. <sup>3</sup> The proportion of school leavers without a Level 2 National Certificate of Educational Achievement (NCEA) fell from 33% in 2009 to 20% in 2016. This improvement was supported by increased school retention and a range of interventions to ensure that more school leavers have this qualification. NCEA Level 2 is the minimum entry requirement for many jobs and further qualifications. Although there are significant differences in skills between ethnic groups, average literacy and numeracy skills have been rising faster among Māori and Pacific people than in the total New Zealand population.
13. As noted in the issues paper, some international measures of school outcomes present a less satisfactory picture. The Programme for International Student Assessment (PISA) trend of declining or static achievement since 2000 (Figure 3.1 of the issues paper) is also reflected in other international studies including the Trends in International Mathematics and Science Study (TIMSS)<sup>4</sup> and the Progress in International Reading Literacy Study (PIRLS).<sup>5</sup> On average, there are large differences in outcomes among people of different ethnic groups. There are also large differences between the mean scores of students from different socio-economic backgrounds, with students from a low socio-economic background scoring lower on average than students from a high socio-economic background.

---

<sup>2</sup> *Skills in New Zealand and around the world*, Ministry of Education and Ministry of Business, Innovation and Employment, 2016: [www.educationcounts.govt.nz/data/assets/pdf\\_file/0003/173514/Skills-in-New-Zealand-and-Around-the-World-Aug-2018.pdf](http://www.educationcounts.govt.nz/data/assets/pdf_file/0003/173514/Skills-in-New-Zealand-and-Around-the-World-Aug-2018.pdf).

<sup>3</sup> *Skills in New Zealand and around the world*, Ministry of Education and Ministry of Business, Innovation and Employment, 2016: [www.educationcounts.govt.nz/data/assets/pdf\\_file/0003/173514/Skills-in-New-Zealand-and-Around-the-World-Aug-2018.pdf](http://www.educationcounts.govt.nz/data/assets/pdf_file/0003/173514/Skills-in-New-Zealand-and-Around-the-World-Aug-2018.pdf).

<sup>4</sup> *TIMSS 2014/15 in New Zealand*, Ministry of Education, 2016: <https://www.educationcounts.govt.nz/publications/series/2571/timss-201415/timss-201415-in-new-zealand>

<sup>5</sup> *PIRLS 2016: New Zealand's Achievement*, Ministry of Education, 2017: <https://www.educationcounts.govt.nz/publications/series/2539/pirls-201516/pirls-201516>

14. Furthermore, the Survey of Adult Skills shows relatively poor matching between the level of qualification held by adults and their assessment of the level of qualification required to get their job. Around one third of people in employment report their qualification is higher than required for their job, and less than 10% reported they were underqualified. This suggests some underutilisation of skills gained through formal qualifications. However, it may also be a sign of a more resilient and adaptable labour force, compared with countries where people mostly work in their areas of formal training. Preparing students for the reality that they end up working outside their area of initial training may be part of getting them ready for the future of work.<sup>6</sup>

### Improving school outcomes

15. The Government has an aspirational Education Work Programme that sets out a significant reform agenda across the whole education system. The Work Programme is aimed at improving access to equal opportunities for all learners and ensuring the system can adapt to the needs of the modern world. As the way we live and work continues to change rapidly, so do the demands we place on our education system. There are key reviews and reforms underway that focus on ensuring the system is set up to respond to the education needs of the future. We highlight just a few initiatives below.
16. Reforms of NCEA will include stronger literacy and numeracy requirements, parity for mātauranga Māori, a simplified structure, greater accessibility, clearer pathways to further education and employment, and a shift to fewer, larger standards. These changes will allow the sector to re-focus effort from assessment to the delivery of cohesive, purposeful programmes of learning.
17. In the compulsory schooling sector, we have revised the Technology Learning Area and Hangarau Wāhanga Ako to strengthen the positioning of digital technologies in The National Curriculum. The goal of this change is to ensure that all learners have the opportunity to become informed, digitally capable individuals. This change signals the need for greater focus on our students building their knowledge and skills so they can be innovative creators of digital solutions, moving beyond solely being users and consumers of digital technologies.
18. From 2020, schools will be required to provide all students in years 1-10 (and 11-13 for those students that choose) with learning opportunities in the revised Technology Learning Area and Hangarau Wāhanga Ako.<sup>7</sup>

#### *Te Rito: access to information to support better outcomes*

19. An example of how the Ministry plans to use technology to improve learning outcomes is Te Rito. Te Rito will be piloted in 2019/20, with full rollout from 2020/21. The data collection, storage and exchange platform will enable accurate and up to date information about learners and learning to be stored safely and securely, and available to any school the learner moves to, regardless of its Student Management System (SMS). It will reduce the administrative burden of duplicated systems and processes for teachers and schools, and (with the appropriate permissions and authorisations) improve the quality and timeliness of data provided to the Ministry and other education agencies. It will support continuity of the right learning support and related funding, and enable groups of schools to recognise how they can combine resources to support learners with common needs.
20. With the appropriate controls, Te Rito can improve coordination with other agencies to support wellbeing and achievement. We are also considering how the platform can support other initiatives like the learning support delivery model (LSDM) and the Learning Support Coordinator role.

---

<sup>6</sup> The Survey of Adult Skills includes three measures of mismatch: Qualification level mismatch, field of study mismatch, and skills mismatch. We consider the *qualification level mismatch* measure as the most robust of the three. The other two measures have considerable methodological issues and should be used with caution. For more information see: *PIAAC measures of qualification, field of study and skill mismatch*, Ministry of Education, 2018: [www.educationcounts.govt.nz/publications/tertiary\\_education/education-literacy/PIAAC-measures-of-qualification,-field-of-study-and-skill-mismatch](http://www.educationcounts.govt.nz/publications/tertiary_education/education-literacy/PIAAC-measures-of-qualification,-field-of-study-and-skill-mismatch)

<sup>7</sup> The strengthened National Curriculum content area can be accessed at: [nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Technology](http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Technology) and [tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Nga-Wahanga-Ako/Hangarau](http://tmoa.tki.org.nz/Te-Marautanga-o-Aotearoa/Nga-Wahanga-Ako/Hangarau). Information on a wide range of curriculum and professional supports can be found at: [technology.tki.org.nz/Technology-in-the-NZC/Digital-technologies-support](http://technology.tki.org.nz/Technology-in-the-NZC/Digital-technologies-support).

## Secondary-tertiary initiatives

21. Current secondary-tertiary initiatives, including Gateway and Trades Academies, offer senior secondary school students broader learning opportunities such as practical work-based learning or vocationally-oriented courses at a tertiary education provider. Eleven of the 24 Trades Academies offer Information Technology training in pathways leading to a range of industry sectors. The Secondary Tertiary Alignment Resource (STAR) is another initiative supporting career-based blends of secondary and tertiary delivery that can help students at risk of disengaging from school.
22. Such initiatives have contributed to higher secondary school retention, attainment and employment outcomes. However, take up and coverage varies across our system, suggesting a need for further work.<sup>8</sup> The inquiry could explore further opportunities for students to learn about digital technologies through secondary-tertiary programmes.

## Foundation-level tertiary delivery

23. Foundation-level tertiary study generally targets those who left school without NCEA Level 2.<sup>9</sup> All foundation-level delivery is fees-free, to minimise barriers to entry.
24. Youth Guarantee Fees-Free places provide foundation-level tertiary study for 15 to 19 year olds who left school with low or no qualifications and allows them to complete these qualifications in a tertiary education setting. It is intended to re-engage young people in education and provide a pathway into further study, training and employment. Enrolments have declined for several years, largely due to demographic change, increasing NCEA attainment in school, and a stronger labour market.
25. Foundation tertiary education is not providing pathways into further study and/or employment as well as it should: only around half of youth who enrol in a Level 1-4 tertiary qualification after leaving school without NCEA Level 2, complete the qualification. Such qualifications, especially at Level 3 or 4, do appear to improve employment outcomes.<sup>10</sup>
26. We intend to progress work on improving the effectiveness of foundation education alongside a set of major system changes that sit around it. Namely, the review of NCEA, the Reform of Vocational Education and the Government's response to the Welfare Expert Advisory Group report.

## Tertiary education

### Formal qualifications

27. Formal tertiary qualifications can signal a consistent level and set of skills that provide valuable information to potential employers. They are essential for entering many occupations, and they can provide a common framework of understanding that has lasting benefits for individuals, employers and communities. People with qualifications at Level 4 and above on the New Zealand Qualifications Framework have lower unemployment rates and higher earnings.<sup>11</sup>
28. Despite this, some employers report a lack of 'work readiness' among some tertiary graduates – a perceived skills gap that includes aspects of social-emotional literacy. A strategy used in some tertiary programmes is to make learning more 'realistic', for example by integrating it with work experience. One

---

<sup>8</sup> *Monitoring Youth Guarantee 2017: Secondary-Tertiary Programmes*, Ministry of Education, 2018:

[www.educationcounts.govt.nz/publications/80898/monitoring-youth-guarantee-2017-secondary-tertiary-programmes](http://www.educationcounts.govt.nz/publications/80898/monitoring-youth-guarantee-2017-secondary-tertiary-programmes).

<sup>9</sup> The Ministry generally defines *foundation* skills as Level 1-2 on the New Zealand Qualifications Framework but these skills can also be taught within Level 3 programmes.

<sup>10</sup> For further information see: *Monitoring Youth Guarantee 2017: Secondary-Tertiary Programmes*, Ministry of Education, 2018: <https://www.educationcounts.govt.nz/publications/80898/monitoring-youth-guarantee-2017-secondary-tertiary-programmes>; and *The Impact of Tertiary Study on the Labour Market Outcomes of Low-qualified School Leavers: An update*, The Treasury, 2018: <https://treasury.govt.nz/publications/wp/wp-18-03>.

<sup>11</sup> *Profile and Trends 2016: Tertiary Education Outcomes and Qualification Completions*, Ministry of Education, 2017: [www.educationcounts.govt.nz/\\_data/assets/pdf\\_file/0017/182303/2016-pt-outcomes-completions-partb2.pdf](http://www.educationcounts.govt.nz/_data/assets/pdf_file/0017/182303/2016-pt-outcomes-completions-partb2.pdf)

example of work integration (in this case involving digital skills) is “P-Tech”, a partnership between The Warehouse Group, IBM and Manukau Institute of Technology.<sup>12</sup>

### **Digital technology learning and provision in tertiary education**

29. In 2016 we compared the use of ‘e-learning methods’ in tertiary education in the 2005-2009 and 2010-2014 periods. The analysis found growth in the use of blends of e-learning and other methods. Completion rates for ‘web-based’ courses were below those for ‘No ICT’ delivery in the earlier period but had almost reached parity with other courses in the later period. This improvement could have been due to the withdrawal of funding for poor quality delivery, or improved capability.<sup>13</sup> Further evidence of the trends in use, and the extent to which digital technology is improving students’ readiness for future workplaces, would be helpful.
30. Participation in sub-degree tertiary programmes specialising in information technology was little over 2,000 in 2018, after much poor quality delivery was removed in the early 2010s. From 2009 to 2018, participation at Bachelors level was relatively steady at around 15-17,000 domestic students. Domestic graduate and postgraduate information technology students grew from 2,360 to 4,170, with international graduate and postgraduate students growing from 1,135 to 3,445. The inquiry may wish to consider the relative importance of these specialised programmes compared to broader programmes that include information technology as a tool. These include engineering (in which participation has been growing).
31. ICT Graduate Schools are collaborations among groups of tertiary providers and ICT employers to improve participation in postgraduate ICT study, and the industry relevance of the delivery. An evaluation in 2018 found that employers valued the work readiness of graduates from the Schools. Providers valued their new connections with industry but said collaborating with competing providers was complex. Extra TEC funding to help establish the Schools will end with the current multi-year contracts, so those involved will need to consider their way forward.

### **Formal programmes to support people to adapt to change**

32. There are a number of ways in which the tertiary education system can help people to upskill to progress their careers or to adapt to change. Barriers to people taking them up could include entry requirements, the costs of current delivery options, and workers’ incomplete awareness of the opportunities available to them.
33. Micro-credentials – short courses focused on a coherent set of competencies – are one way to ensure that skills remain relevant in highly variable work environments. Following regulatory and funding changes in the last two years, we are beginning to see the introduction of micro-credentials of 50 to 400 hours. If the opportunity is taken up by tertiary education organisations, micro-credentials could increase the accessibility of education and training for people looking to upskill or retrain to keep their skills relevant – while employed, while between assignments, or after being displaced from employment.
34. Recognition of Prior Learning (RPL) is a valuable process for some workers adapting to change. It can help identify existing skills, suggesting future career and training directions, and it can greatly reduce the cost of gaining a formal credential. RPL is available from ITOs, Institutes of Technology and Polytechnics (ITPs) and some other providers.<sup>14</sup> It costs significantly less to deliver than a programme with the same content, but it is not cost-free and it has no specific funding. The inquiry could consider what additional encouragement or support for RPL may be warranted.

---

<sup>12</sup> [www.thewarehousegroup.co.nz/news-updates/founding-partner-p-tech-nz-address-digital-skills-shortage](http://www.thewarehousegroup.co.nz/news-updates/founding-partner-p-tech-nz-address-digital-skills-shortage).

<sup>13</sup> *E-learning provision, participation and performance*, Ministry of Education, 2016: [www.educationcounts.govt.nz/data/assets/pdf\\_file/0006/172545/e-Learning-Provision-Participation-and-Performance.pdf](http://www.educationcounts.govt.nz/data/assets/pdf_file/0006/172545/e-Learning-Provision-Participation-and-Performance.pdf).

<sup>14</sup> *Recognition of Prior Learning – survey summary*, New Zealand Qualifications Authority (NZQA), 2017: [www.nzqa.govt.nz/assets/About-us/News/RPL-survey-summary/FINAL-RPL-Survey-summary.pdf](http://www.nzqa.govt.nz/assets/About-us/News/RPL-survey-summary/FINAL-RPL-Survey-summary.pdf). NZQA has also published new guidelines for the recognition and award of learning for credit: [www.nzqa.govt.nz/providers-partners/qa-system-for-teos/guidelines-recognition-of-learning/](http://www.nzqa.govt.nz/providers-partners/qa-system-for-teos/guidelines-recognition-of-learning/).

## Reform of vocational education

35. The Ministry and the TEC have engaged extensively with vocational education stakeholders in the last 18 months. We found that the vocational system was in need of fundamental reform. There were concerns that the current system does not support workers to retrain, re-skill, or upskill as and when required to adapt to the evolving world of work. This was a particular worry for those in mid-career who could not afford not to earn while learning. We also found some regions are grappling with grave skills shortages due to too many low-skilled workers being unable to adapt to rapid changes in industrial technology.
36. Earlier this year the Government consulted on proposals for a Reform of Vocational Education (RoVE): a significant reform with the goal to create a unified system that is responsive to, and delivers the skills needs of all learners, employers, and communities. The RoVE proposals would enable a more seamless transition between training and work, strengthen and support regional skills development through Regional Leadership Groups, and expand industry's role in skills training through the proposed skills leadership role. This could mean, for example, improving students' access to workplace experience and improving access to specialised tuition for trainees and apprentices with particular needs.<sup>15</sup>
37. At the time of writing we are awaiting final policy decisions on RoVE. If the proposals are approved there will be further engagement with key stakeholders to ensure that they are implemented in a way that results in the best possible outcomes.

## Improving the relevance of degree-level tertiary education

38. Students who gain degrees in New Zealand generally have excellent employment outcomes. However, the Commission may wish to further explore how degree-level delivery could stay ahead of changes in the technology used in workplaces.
39. Reforming vocational education so that ITPs and Wānanga have more engagement with industry, and to achieve economies of scale and increased collaboration, could improve degree-level education at these institutions. Universities may find industry bodies with a clear focus on skills leadership a useful source of industry connections and information on technology trends.

## Informal and non-formal education and training

40. While we value formal qualifications, many, perhaps the majority, of the skills used by experienced workers were gained in other ways.
41. Short privately-funded training courses (typically under 50 hours) are widely available in the professions and some trades, some subsidised by industry bodies (e.g. DairyNZ). Private funding for these courses is generally appropriate, because the cost to participants is relatively low and the benefits to participants are often immediate. However, as noted in the issues paper, those in low-skilled jobs are much less likely to engage in work-related training.
42. Adult and community education (ACE) is largely focused on re-engaging adults with education and is a key part of lifelong learning (not just for low-skilled adults). The training is in small 'bites', typically 10-80 hours per learner. It requires a funding model with low transaction costs, which limits the collection of data on participation and effectiveness. However, research suggests that this flexible and low-stakes form of education can improve employment prospects and mental wellbeing, including for learners who lack the confidence to commit to formal study.<sup>16</sup> The Ministry is working with the ACE sector to design a vision and priorities for ACE that take account of New Zealand's changing demography, increasing globalisation, fiscal and social pressures, the changing nature of work, and technology disruption.

---

<sup>15</sup> Further details can be found at the Ministry of Education's Korero Mātauranga | Education Conversation website: <https://www.conversation.education.govt.nz/conversations/reform-of-vocational-education/>

<sup>16</sup> *Adult Learners in the ACE context: Evaluation and review to support sustained learner success*, Ako Aotearoa, 2017: [ako.ac.nz/knowledge-centre/ace-learning-success/adult-learners-in-the-ace-context-evaluation-and-review-to-support-sustained-learner-success/](http://ako.ac.nz/knowledge-centre/ace-learning-success/adult-learners-in-the-ace-context-evaluation-and-review-to-support-sustained-learner-success/).

43. The government has also been working on improving adult literacy and numeracy skills; with a focus on the quality of teaching in foundation-level learning<sup>17</sup> as well as embedding these skills in the development of other skills such as vocational learning. The Learning and Progressions for Adults, the Literacy and Numeracy for Adults Assessment Tool, and Pathways Awarua tools support educators to tailor and focus on the teaching that will make the most difference for learners. TEC also funds Ako Aotearoa (The National Centre of Tertiary Teaching Excellence) to support education to apply good teaching and learning practice.
44. As well as ACE the government funds targeted literacy and numeracy learning opportunities. These include the Intensive Literacy and Numeracy fund for learners with low-level literacy and numeracy skills and the Workplace Literacy and Numeracy fund for employees. The TEC also funds English for Speakers of Other Languages (ESOL) courses to help adult learners gain the literacy and numeracy skills needed to progress to further study or the workplace. There is some evidence of the effectiveness of the Workplace Literacy and Numeracy programme, but we are interested in getting more information on literacy and numeracy outcomes from the other programmes.

### Digital divides

45. Questions 20 and 21 of the issues paper ask about evidence of digital divides in New Zealand, their consequences for labour market participation, and potential measures to address digital divides. We describe some evidence of digital divides, and note a current initiative aimed at addressing such divides in schools.

#### In schools

46. In A Commentary on Digital Futures and Education, Professor Stuart McNaughton, Chief Science Advisor, Ministry of Education and Professor Sir Peter Gluckman, Chief Science Advisor to the Prime Minister highlighted 2014 and 2015 evidence that while over 90% of schools provided online learning, student access at home was affected by factors like income, ethnicity and location. This may have eased somewhat due to wider broadband access but, extrapolating from 2013 census data, an estimated 100,000 students (in 40,000 homes) have no internet access. There is also evidence of less complex and educationally relevant internet usage by students in poorer and less privileged communities. Poor access to technology affects both student learning at home, and their sense of inclusion and confidence in online learning in the classroom.<sup>18</sup>
47. As noted in the issues paper, the Ministry's Equitable Digital Access initiative is working to identify solutions for the digital divide for school students, supporting pilots in Rata Street Primary School, Haeata Community Campus and Murupara Area School.

#### In tertiary education

48. We have little systematic information on variations in access to digital technology in the tertiary education sector. Anecdotally it appears to be widely used by students, with all tertiary education organisations using digital technology in administration and increasing numbers using it in delivery and to monitor learner progress.

#### In the adult population and the workplace

49. As shown in Table 1, the 2006 and 2014 Surveys of Adult Skills showed that qualification level is a good indicator of how likely 16-65 year olds are to use a computer for work. Nine out of ten workers with at least a Level 5 qualification use a computer at work, compared with a little over half of workers with no more than lower secondary education. This pattern was similar at both time points. The proportion of the

---

<sup>17</sup> The Ministry generally defines *foundation* skills as Level 1-2 on the New Zealand Qualifications Framework but these skills can also be taught within Level 3 programmes

<sup>18</sup> A *Commentary on Digital Futures and Education*, Office of the Prime Minister's Chief Science Advisor, 2018: [www.pmcsa.org.nz/wp-content/uploads/18-04-06-Digital-Futures-and-Education.pdf](http://www.pmcsa.org.nz/wp-content/uploads/18-04-06-Digital-Futures-and-Education.pdf).

workforce with high qualifications rose, and the proportion of the low-qualified using a computer at work fell slightly. Further surveys will help to establish whether there is a genuine downward trend in workplace computer use by the low-qualified.

50. People who use a computer for work and are employed in large firms or organisations tend to have higher problem solving skills than those working in small companies. People who don't use a computer for work have lower problem solving skills on average whatever the size of the company or organisation they work for. Professionals, managers and clerical workers who use a computer at work are most likely to have high problem solving skills.
51. These patterns reinforce the point that people in low-skilled jobs have less access to on-job learning about technology. The Commission may wish to further explore the causes and implications of these patterns.

**Table 1: Proportions (%) of employed people by qualification level and whether they use a computer at work, 2006 and 2014**

Qualification level	2006		2014	
	Proportion of employed people	Proportion of employed people using a computer at work	Proportion of employed people	Proportion of employed people using a computer at work
Lower secondary or lower	20	56	18	53
Upper secondary or Level 4	39	72	34	71
Level 5 or higher	40	87	48	89
Total	100	75	100	76

### Education and training in active labour market policies

52. The issues paper asks about the effectiveness of active labour market policies in the future work environment, and how these policies might need to change (question 15).
53. As part of the Welfare Expert Advisory Group (WEAG) report work stream to develop and implement better active labour market programmes we are considering approaches to strengthen foundation tertiary education, which includes the Youth Guarantee fees-free programme. This includes options to expand access to mixed delivery models that include provider based foundation education, work experience and work based learning.
54. A recent literature review suggests a need for fewer, longer, and more cross-government, holistic interventions for youth at risk of long-term limited employment.<sup>19</sup> These need to begin before age 15 to develop employability before young people leave school. International evidence indicates that such training should be targeted and should integrate work experience, job search, and pastoral support.

### Career system strategy and in-school career education

<sup>19</sup> *Not just about NEETs: A rapid review of evidence on what works for youth at risk of limited employment*, Ministry of Education, 2019: [www.educationcounts.govt.nz/publications/80898/not-just-about-neets](http://www.educationcounts.govt.nz/publications/80898/not-just-about-neets).

55. The issues paper asks what changes are needed to give people the skills to make informed decisions about education and careers (question 28).
56. The TEC and the Ministry are developing a Careers System Strategy that supports businesses, learners, and people preparing for work, people in the workforce, and those disengaged from education and employment. It is intended to guide the creation and delivery of information, advice, and support for learners aged 7 to 74. The Strategy seeks to focus on supporting lifelong learning and helping people to find fulfilling careers, in the face of what may be frequent job changes and fluid ways of working.<sup>20</sup>
57. TEC intends to begin consultation on the Strategy shortly.

### Changing employment relationships

58. The issues paper asks about the implications of new work arrangements (question 10). More fluid employment relationships present challenges for the traditional model of workplace training, which depend on mutual commitments by an employee and an employer. There may need to be new options to access formal training for contractors engaged outside of a traditional employment contract with a firm.
59. There is a risk that weaker employment relationships could deepen digital divides by further reducing access to workplace training for the low-skilled. It is sometimes suggested that this means that formalised workplace training should be made more widely available to contractors.
60. The inquiry could consider the incentives driving employer and learner behaviour, and the questions of who should have responsibility for skills acquisition and who should provide and pay for it. Employers could become increasingly dependent on training that is fully funded by learners and the public.

### Strengthening international connections

61. Question 33 of the issues paper asks what steps should be taken to strengthen the international connections of New Zealand firms. There are a number of existing opportunities that involve tertiary providers and other organisations the Ministry of Education works with.
62. The tertiary education sector can help firms make international connections. Universities are linked into international research networks. Centres of Asia Pacific Excellence (CAPEs) are university-led, cross-institutional centres of excellence in language, culture, politics and economics of the Asia-Pacific region that must also collaborate with other organisations. They develop Asia-Pacific knowledge and language skills and enhance economic, trade, political and cultural relationships with the region, including by supporting entrepreneurship and business relationships.
63. Education New Zealand actively promotes New Zealand's education services overseas.
64. The Ministry works alongside the Asia New Zealand Foundation (ANZF), which offers internships, grants and residences for New Zealanders to travel to Asia to learn about relevant areas of work first hand. It offers a number of targeted business internships and entrepreneurial programmes.
65. The Asia Pacific Economic Cooperation Organisation (APEC) supports and grows economic cooperation in the Asia-Pacific region. The Ministry works with APEC's Education Network of the Human Resources and Development Group on engagement, research, and projects to support identification and development of the region's current and future workforce needs.

### Conclusion

66. Judging from present trends, the quantity and quality of jobs will continue to change, and so will the demand for different sets of skills. The education system is striving to improve the delivery of the essential foundation skills needed to succeed in this new world of work, especially for our historically underserved Māori and Pacific learners. There are significant developments and reforms underway that will improve the system's responsiveness to these changing demands. These include strategies to ensure the education system meets the needs of Māori and Pacific learners, and the preparation of a Statement of National Education and Learning Priorities (NELP), and a new Tertiary Education Strategy (TES). The TES will identify priorities and actions to give effect to the Government's vision, potentially

---

<sup>20</sup> See: [https://tec.govt.nz/assets/Publications-and-others/b6f5865ef4/B\\_18\\_00248-TEC-reorganisation-and-Careers-System-Strategy-update.pdf](https://tec.govt.nz/assets/Publications-and-others/b6f5865ef4/B_18_00248-TEC-reorganisation-and-Careers-System-Strategy-update.pdf).

including: improved integration of work-based learning; increased responsiveness to economic and technological change; and support for lifelong learning and clear pathways through the education system.<sup>21</sup>

- 67.** This submission has focused on describing some aspects of the current state of our skills system that we think are relevant to the Inquiry. We look forward to further engagement with the Commission and seeing what conclusions and new ideas emerge in the next stage.

---

<sup>21</sup> Information about the National Education and Learning Priorities can be found on the Ministry of Education's Korero Mātauranga | Education Conversation website: <https://www.conversation.education.govt.nz/conversations/national-education-and-learning-priorities/>



We **shape** an **education** system that delivers  
**equitable** and **excellent outcomes**

---

He mea **tārai** e mātou te **mātauranga**  
kia **rangatira** ai, kia **mana taurite** ai ōna **huanga**

# Education System Digital Strategy

## *Transforming Education for the Digital Age*

2015-2020



# Contents

---

FOREWORD FROM THE SECRETARY FOR EDUCATION .....	3
VISION: A DIGITALLY-ENABLED EDUCATION SYSTEM FOR NEW ZEALAND .....	4
A1 – A vision for a digitally-enabled education system .....	5
A2 – What achieving the vision will mean.....	6
A3 – Context for change .....	7
A4 - Contribution to Government priorities.....	8
A5 – Describing the target states.....	10
GOVERNANCE .....	15
THE STRATEGY IN DEPTH.....	17
THE WORK PROGRAMME.....	29

## Foreword from the Secretary for Education

---

Digital technologies and the internet are profoundly affecting the lives and work of all New Zealanders.

We can expect the impacts of technology to be even greater in the future, as technology innovation grows exponentially and the world becomes increasingly connected.

We can no longer view digital technologies as simply the means to make what we already do cheaper and faster; instead we must harness its potential to transform how our system operates.

An integrated, fully digitally-enabled education system is critical if we are to achieve our aim to equip our young people with the skills they need for success in a digital world.

I welcome and whole-heartedly support this education system digital strategy: Transforming education for the digital age.

This will take a collective commitment from all of us in the education system – educators, leaders, administrators and agencies – combined with strong governance across the education system agencies and our sector partners. The success of this strategy will depend on new ways of working, in which we collaborate to achieve a fully integrated system designed to serve the needs and aspirations of all learners.

The changes envisaged here are ambitious but achievable.

We will know we are successful when every student from early childhood through to employment experiences rich and culturally appropriate learning opportunities with high-quality digital resources and interactions; when assessment is woven seamlessly into the process of learning; and when transitions between education settings are smooth, efficient and effective.

We will know we are successful when educators and leaders feel well supported throughout their careers and have the opportunity to work to

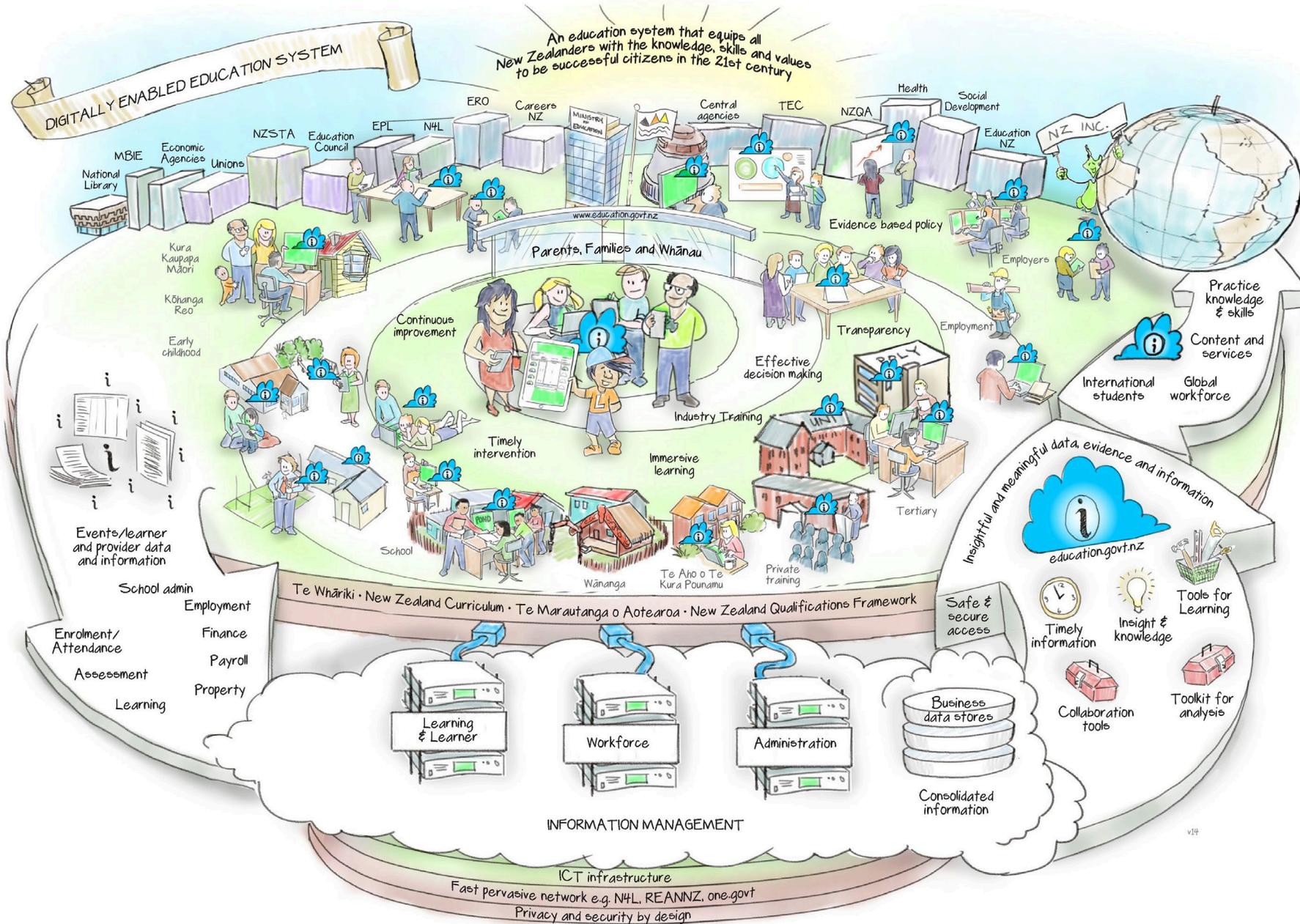
their strengths; and when all those who administer the system have the tools, information and data they need when they need it.

I commend the work done to create this strategy. I am confident it will prove a reliable guide on the exciting journey ahead. I have no doubt that by working together we will be successful in our common goal to be a world-leading education system.

Peter Hughes  
Secretary for Education



# Vision: A digitally-enabled education system for New Zealand



## A1 – A vision for a digitally-enabled education system

---

The New Zealand education system aims to prepare young people for a digital world of rapid change and significant challenges. New Zealand's future depends on everyone being a competent and confident life-long learner, able to adapt quickly to change and apply their learning to create and innovate throughout their lives.

Within the next decade it is likely we'll see radical changes in education driven by digital technologies. Right now we have the chance to be ambitious in building on the technologies available today by leveraging the investment in infrastructure and the enthusiasm of students, educators and leaders to embrace the tremendous advantages technologies have to offer.

The ubiquity of digital technologies in modern societies has for the first time opened up the opportunity to adopt learner-centric pedagogies at scale, underpinned by smart tools, rich data and powerful analytics.

This strategy signals a fundamental shift from a system with organisations at the centre to a system with the learner at the centre. New technologies provide the means to adapt the education system to fit the learner's needs, collapsing traditional boundaries to create an integrated, seamless system characterised by:

- personalised, self-directed, authentic learning available to all, with students' data and records of learning travelling with them
- the means for all students to develop higher-order competencies, including digital fluency, complex problem-solving, collaboration and team-work
- strong, active learning relationships between learning providers, students, educators, parents, whānau, communities and business
- common tools and platforms providing access to secure, accurate, up-to-date information that is easy for users to find

- effective stewardship of the system led in collaboration with sector representative groups and central agencies
- targeted investments to upgrade system infrastructure as new advances in technologies provide opportunities for innovation and improvement.

The strategy and supporting work programme are designed to achieve the target state in four areas:

### Innovative and responsive learning environments

The education system will be characterised by a strong culture of innovation and the use of new technologies to expand learning opportunities for all students. Traditional boundaries will collapse, enabling students to access learning from a range of providers at any time.

### Efficient administration of the education system

Common tools and systems, and the integrated collection and sharing of data, will provide access to rich, timely information to those who need it, and reduce administrative time and overheads.

### Engaged and productive education workforce

The education workforce will be supported by common services for registration, recruitment, remuneration, and professional development and learning. Integrated data and information systems will enable efficient workforce management.

### Effective corporate and common services

A common infrastructure and shared services will be underpinned by standards-based systems for security, privacy, and identity and access management.

## A2 – What achieving the vision will mean

---

### To students and learners

- I am in the driving seat of my learning. I make choices with expert guidance from educators who work with my family and me to plan and support my learning.
- I learn alongside others in my community. Learning is collaborative. I teach as well as learn.
- I am confident using digital technologies and I can apply computational thinking to solve problems.
- I own my own record of learning. It is immediately accessible wherever I am and I can go on adding to it throughout my life.
- I can choose from a number of locations, providers and online resources to learn about topics that interest me. I am gaining skills and knowledge that will help me achieve my dreams for the future.
- My progress is assessed as I go and I can use a range of ways to demonstrate what I've learned. Using smart technologies means skills like communication, teamwork and problem solving are assessed along with my subject knowledge.
- I get high-quality information about career opportunities and my future prospects, so I'm confident I can choose the right mix of things to study.
- I trust the system to protect my information and privacy.

### To parents, caregivers, family members and whānau

- I am an active partner in my children's education and I can follow their progress through the education system.
- I get all the information I need when I need it to help me support my children's learning.

### To teachers and educators

- Using digital technologies has transformed my teaching practice. I see my role as an activator of learning, providing expert advice and mentoring to support students to direct their own learning.
- Digital technologies are integrated seamlessly into everything I do. Smart tools enable me to plan, manage and record effectively, freeing me up to focus on supporting students with their learning.
- I have accurate, timely information at my fingertips wherever and whenever I need it.

### To schools and education providers

- Smart technologies enable me to operate within an interdependent community of learning, supporting students and staff who can learn from a range of providers. Students and staff move seamlessly between physical and virtual learning settings.
- I have access to quality assured, comprehensive information on which to base decisions. I can trust the integrity and security of the data I use. I input data once and can use it many times.

### To education sector agencies and Government

- Smart tools and common IT systems make delivering service improvements and implementing policy changes simpler and less expensive than they used to be, freeing up investment to improve outcomes for students and educators.

## A3 – Context for change

---

### The digital world

Digital technologies are an integral part of modern societies and have transformed almost every aspect of life. Mobile technologies and the internet are ubiquitous and have changed how we think about knowledge and learning.

### The digital economy

The nature of work is changing rapidly as new technologies replace unskilled and many skilled jobs. Today's employers seek young people who can demonstrate higher-order skills along with subject knowledge, such as digital fluency, entrepreneurship, advanced communication skills and the ability to collaborate to solve complex problems.

### Government investment in modernised ICT infrastructure

New Zealand education is at a tipping point. While digital technologies have been around for a long time, the Government's investment in a national fibre network and upgraded infrastructure is giving every New Zealand student and educator access to the benefits of new technologies and high-speed broadband.

Modernised infrastructure is making administration easier and more efficient, and enabling education providers to collect, analyse and share large amounts of data easily.

### Transparent government

Modern democracies increasingly demand accurate, timely information as digital technologies give everyone the means to access it. Education providers and agencies generate vast amounts of information, which they currently hold in their own systems. This is resulting in duplication of effort, and making data difficult to collate, analyse and use to improve services.

### Rapid technological change

The rapid uptake of technologies is creating new opportunities and challenges, for example:

- *Mobile computing* is opening up new opportunities for personalised learning and seamless access to internet tools and resources. Mobile devices are giving students opportunities to learn anywhere, anytime from a range of providers
- *Apps for teaching and learning* are growing exponentially, getting less expensive to implement at scale, and presenting highly interactive, engaging ways to learn
- *Globalisation of education* is creating new opportunities to deliver online education, including export education, but poses a risk that we lose market share if we fail to exploit the opportunities
- *Open content* is making online content easy to use, share and re-purpose through schemes such as Creative Commons
- *Learning analytics* are enabling learning programmes to be precisely tailored to meet the needs of individual learners and targeted groups
- *Cloud computing* is increasing flexibility, improving the speed of deployment and reducing the IT management burden on individual organisations
- *Social networking and gamification* are creating new levels of interaction and engagement with learning and other education management systems as well as contributing to learning analytics
- *Privacy and security concerns* are growing as educators and students use the web to create, use and store data.

## A4 - Contribution to Government priorities

We expect the digital strategy to make an important contribution to achieving the Government's aims for education. Integrated systems based on common standards for data collection, security, privacy, and identity and access management are necessary enablers for collaboration across agencies and between providers.

### Government economic and social priorities

The Government has four key priority areas to which the education system contributes:

1. *Delivering better public services (BPS) targets*, of which three are in education:
  - increase participation in early childhood education
  - increase the proportion of 18 year-olds with NCEA Level 2 or equivalent
  - increase the proportion of 25-34 year-olds with advanced trade qualifications, diplomas and degrees at Level 4 or above.
2. *Business Growth Agenda (BGA)*, to which education agencies contribute in three work-streams: Skilled and Safe Workplaces, Innovation, and Export Markets.
3. *Rebuilding Canterbury*, which offers a unique opportunity to build a state-of-the-art education network in New Zealand.
4. *Responsibly managing the Government's finances*.

### Education system strategic intentions

We aim for the education system to achieve the three key outcomes set out below. Achieving these are pre-requisites to delivering the longer- term social, cultural and economic outcomes we seek for New Zealand.

1. *The education system is relevant and reaches all children and students*. Education is accessible, seamless and flexible enough to accommodate different aspects of learners' lives and varying needs throughout their lives.
2. *Every child and student achieves educational success*. We aim for a system that is tailored to the needs of students from early childhood to tertiary and into employment. Every student, no matter their background or needs, is supported to meet their potential. The success of our future society and economy rests in large part on getting better educational achievement with less disparity.
3. *New Zealanders have the skills and knowledge for work and life*. An effective education system provides qualifications that open doors to future opportunities and the skills needed in a modern society and modern workplaces.

New Zealand needs an education system that provides its people with the skills and knowledge they need to be successful in life and in an increasingly global economy. Demand for future-focused learning is increasing. This Strategy and the Government's objective to strengthen 21st Century practice in teaching and learning will help ensure that we have the right focus for this outcome.

## Government ICT Strategy

The intended outcomes of the digital strategy are also consistent with the Government's ICT Strategy and Action Plan, which aims to ensure:

- Customers experience seamless, integrated and trusted public services
- Information-driven insights are reshaping services and policies, and adding public and private value
- Adoption of information and technology innovations is accelerated and value is being created
- Investment in innovative digital services is being prioritised and benefits are being realised
- Complex problems are being solved and innovative solutions are being adopted

## Education system stewardship

The Education System Stewardship Forum is providing unified and collaborative leadership in the areas of strategic direction, sector governance, delivery of government priorities, resource sharing and co-operation in education system delivery.

The Forum's objectives are:

- A focus on the performance of the education system and its key outcomes
- Effective stewardship of the education system through joined-up work programmes in key strategy and policy areas
- Environmental scanning and strategic thinking on the future of the system
- Alignment of education system-wide strategy, policy and associated Budget processes
- Delivery of the system's Better Public Services Action Plan and targets
- Coherent cross-agency reporting to Ministers on education system performance, pressures, and priorities.

The Forum is the sponsor of this strategy. The Forum has established the Education System ICT Board to take responsibility for the delivery of the strategy and associated work programme.

This Board will play a critical role in the success of the digital strategy. Effective governance should ensure that investment decisions are made through collaboration between agencies and are consistent with the intent of the strategy.

## A5 – Describing the target states

### Modern and responsive learning environments

The Digital Strategy aims to create the conditions in which innovation flourishes and state-of-art technologies are used as a matter of course to enhance learning outcomes and streamline administration.

We will know the Digital Strategy is successful when the system is centred around the needs of students; when students have autonomy and choice in what and how they learn, and are supported by expert guidance from skilled educators.

Smart tools and resources will amplify the variety and capability of educators and students. A strong and growing evidence base will help students, leaders, educators and education agencies make effective decisions about new practices in teaching, learning, assessment and administration. The target state is illustrated in the graphic overleaf, and from the perspectives of key participants in the *Supporting Modern Learning Practices* posters in Appendix 1.

*We will know we are successful when:*

- All leaders and educators use learning practices that make the most of modern learning environments
- All students are engaged and achieving, including being able to demonstrate 21<sup>st</sup> century skills
- All students have equitable access to digital learning opportunities
- Core services are provided nationally using a common platform, with most services based in the cloud
- Rich information about students and their record of learning and achievement transfer easily across institutional boundaries and enable students to learn from a range of sources
- Students have adaptive, individualised learning pathways enhanced by the use of sophisticated forms of assessment,

including new ways to demonstrate achievement and gain qualifications

- Effective privacy and security practices ensure data and information are secure and the public can trust the systems used to hold students' records of learning
- IT infrastructure is maintained and upgraded over time so educators and students can keep up with new technologies as they emerge
- Funding and performance measurement models for institutions accommodate the greater flexibility needed for students to learn from a range of sources and educators to share their expertise with others
- Education institutions are interdependent, networked with other sites of learning such as libraries, marae, and workplaces.

**cloud-based services**  
**interoperable systems**  
**anywhere, anytime learning**  
**equitable access**  
**data follows the student**  
**interdependent system**  
**thriving communities & networks**  
**responsive IT infrastructure**

# NEW ZEALAND EDUCATION IN 2025: LIFELONG LEARNERS IN A CONNECTED WORLD

▲▲▲  
 MINISTRY OF EDUCATION  
 Discussion Document | April 2015  
 Not Government Policy  
**DRAFT**  
 26/05/15

A highly connected, interdependent education system that equips students with skills for the future, fosters students' identity, language and culture, and prepares students to participate as successful citizens in the 21st century.

An illustrative vision

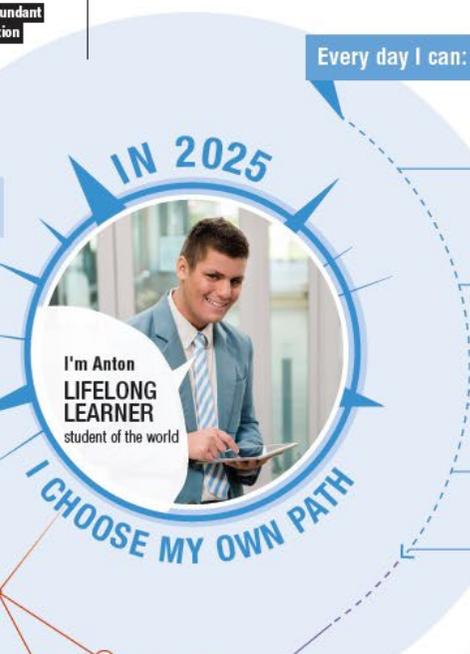
## We learn in a complex world

- High rate of change
- Demand for new specialised skills
- Hyperabundant information

### Here's how I learn

- I learn collaboratively
- I learn by being digitally connected
- My identity, language, culture and place are valued
- I'm able to explore in depth subjects I'm passionate about
- I find gaming a great way to help my learning
- I learn from my peers. We teach and learn from each other.

We live and learn... in a vast network.



## We never stop learning

Everyone is a learner from birth, within a connected, interdependent education system.

### Every day I can:

- Learn within my community. I get to learn with people of all ages. We're connected internationally.
- Work alongside kaumātua at my marae, which is a centre of excellence in indigenous language revitalisation and stay connected with my iwi.
- Study science, maths and music through the learning centre at my marae, advanced chemistry through the learning centre at Callaghan Innovation, and Māori studies with Waikato University.
- Meet my learning mentor every other day and skype her whenever I need to.
- Set my goals and reach them, with the help of my Learning Mentor and everyone who supports me to learn.

### I can also...

connect with other learning centres and specialists to study subjects in depth.

## We are all connected

Learning centres are connected and interdependent. They could be attached to community hubs like libraries or marae, or to business centres or innovation zones. They allow learners of any age to come together. For example:

### Anton's marae

His primary learning centre



### Pedagogical Specialist

Pedagogical Specialists lead teams of Learning Mentors; overseeing professional development, assuring quality outcomes for learners, moderating content and developing curriculum resources.



### Robotics specialist

MIT OpenCourseWare Massachusetts, US



### Chemistry specialist

Callaghan Innovation Wellington, NZ



## We're all... lifelong learners

### Primary Learning Mentor

Teachers are Learning Mentors; skilled professionals who work with groups of learners to set goals, give advice about learning pathways and provide a mix of direct and guided instruction.



### Sports specialist

Sporting centre of excellence Palmerston North, NZ



### Language and culture specialists

Aboriginal Learning Centre Northern Territory, AUS



### Peers

"I work closely with other students, either face-to-face or online. I can connect with people who are 'like' me."



### Whānau

"We've got a great relationship with Anton's Learning Mentor and his specialist teachers. We catch up for whānau meetings every week. It's a genuine partnership. We have opportunities to learn alongside Anton too."

## Harnessing technology

A pervasive digital environment is empowering learners as never before, allowing them to take charge of their own learning anywhere, anytime.

The flexibility to learn when and where best suits them, while staying safe



e.g. Immersive technologies allow learning in virtual worlds.

The ability to work and study specific disciplines in depth with others



e.g. complex timetabling means efficient coordination of learning experiences.

Real time knowledge of the learner's progress and next learning steps



e.g. learning analytics means sophisticated assessment in real time.

Recognition Technology makes connecting to online learning quick and easy



e.g. a single, secure logon.

Efficient administration means schools can focus on teaching and learning



e.g. cloud-based, serverless learning centres.

## Efficient administration of the education system

Technology presents significant opportunities to simplify and reduce the administrative workload faced by education providers and other participants in the education system. This includes smarter shared services options, and streamlined collection and appropriate sharing of data and information.

*We will know we are successful when:*

- Information flows seamlessly from education provider systems, improving timeliness and reducing data management and administrative burden for providers and agencies
- Student record transfer is routine, so that an individual's complete journey through the education system is available to them
- There is strong support and advice on good practice use of ICT in the education system for all participants
- Providers have improved access to the data and information they need to support them in their decision-making. This is underpinned by a series of high quality data analytics and reporting tools, and an education system business intelligence capability
- There is mature governance and successful delivery of high quality shared services, whether they are delivered by the private sector or by education sector agencies
- Strategic versus operational ownership of data is clear, with roles and responsibilities for managing data agreed, including who can access what kind of data and when.

**information management**

**lower compliance costs**

**event-based data collection**

**process improvement**

**shared services**

**common infrastructure**

**learner systems improved**

**communities of learning**

## Engaged and productive education workforce

Smart systems and new technologies give us the tools to support system transformation, but it is an engaged, committed workforce that makes it happen.

An important objective of this strategy is to ensure education employers and employees are well supported by common, secure services for registration, recruitment, remuneration, and professional development and learning.

In the highly flexible, adaptive education system we envisage for the future we expect educators and leaders to take collective responsibility for the success of all the students in their communities. They will need tools that make it easy to work together, share information and share effective practices. This strategy includes providing tools to enable educators to collaborate online as well as face-to-face.

*We will know we are successful when:*

- Educators and leaders are well supported throughout their careers in education and are motivated to do their best work
- Employees in the education sector have access to their own employment related information and can interact directly with the systems used to store and manage it
- Information systems supporting routine workflows for registration, recruitment, remuneration and professional learning and development are standardised, reducing compliance costs and streamlining processes
- Effective tools to support online and face-to-face collaboration among educators enable modern learning practices to be quickly identified and shared
- There is increased confidence in employment practices, supported by high-quality tools and solutions

- Education sector agencies have access to high-quality, timely information to inform reporting, forecasting and education system interventions.

free to focus on what matters most  
tools for collaboration  
access to my employment history  
professional development  
information management  
streamlined recruitment  
protecting vulnerable children  
process improvement  
shared services

## Effective corporate and common services

There will be a common infrastructure and a range of shared services to support education providers and sector agencies. This environment will be underpinned by a standards-based approach to security, privacy, and identity and access management.

*We will know we are successful when:*

- Education sector agencies consume services and solutions rather than maintain their own separate corporate information systems
- Workflow and process improvement are enabled by the availability of high-quality information systems to support education sector agencies
- National frameworks and policies for security, privacy, and identity and access management, are in place to support the education system
- Common infrastructure reduces the cost and resource burden of maintaining and managing these environments across the education system.

**streamlined workflow**

**joined-up government**

**self-service**

**information management**

**collaboration**

**consume services & infrastructure**

**value for money**

**process improvement**

**mobility**

**sharing by default**

**client focussed channels**

# Governance

---

Governance arrangements, as set out on page 16 below, are being established to ensure the effective, collaborative implementation of the strategy.

The organisations represented on the Education System ICT Board are:

- Careers New Zealand
- Education New Zealand
- Education Payroll Limited (EPL)
- Education Review Office (ERO)
- Ministry of Education
- Network for Learning Limited (N4L)
- New Zealand Qualifications Authority (NZQA)
- Education Council of Aotearoa New Zealand
- Te Aho o Te Kura Pounamu (Te Kura)
- Tertiary Education Commission (TEC)

Types of education providers include:

- privately and community-owned early learning education services
- state and state-integrated schools and kura, partnership schools and private schools
- publicly and privately owned tertiary education providers.

The Ministry of Education acts as the steward of the education system and the government's lead advisor on the education system. In those capacities the Ministry is leading this strategy on behalf of the education sector agencies and the broader education system.

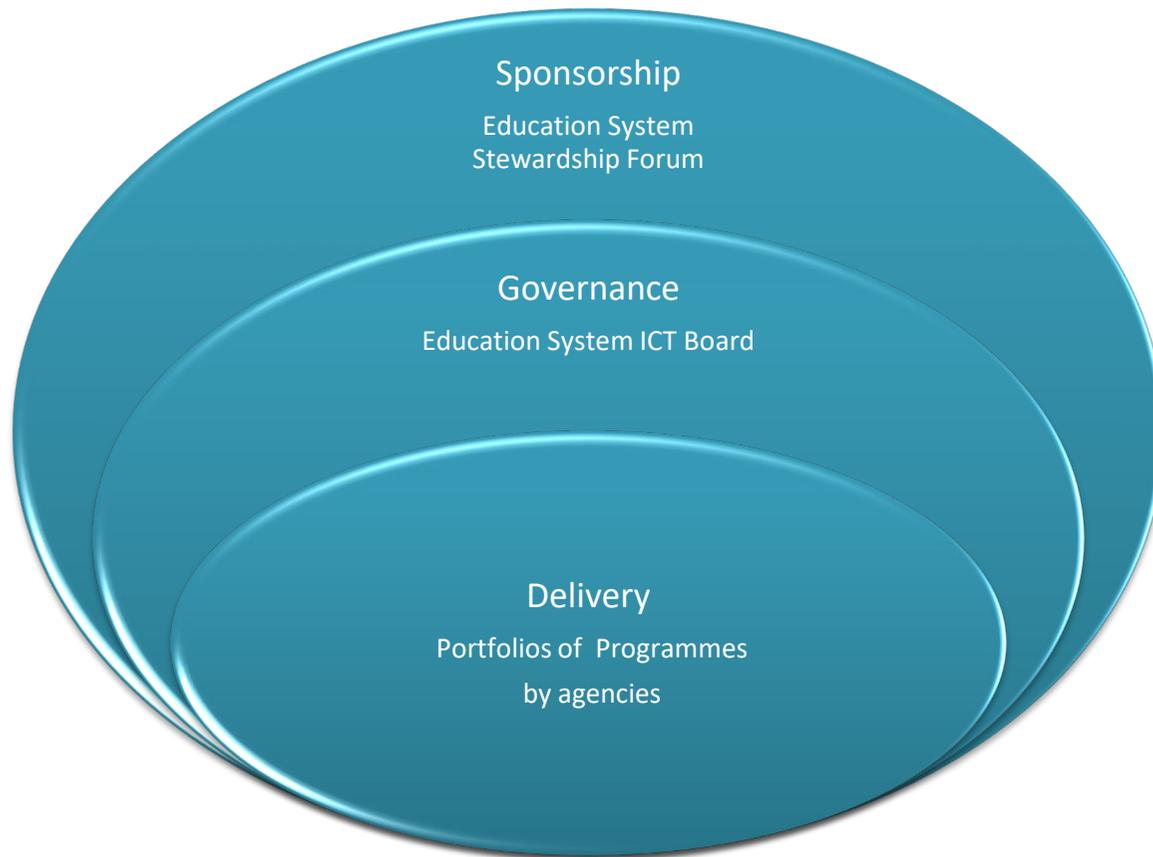
## Governance digital investment

To achieve this strategy's successful implementation, we need effective governance across the education system supported by active leadership at all levels. Over the next 18 months appropriate governance and management systems will be established that address:

- system-wide governance for the strategy and associated work programme
- inter-agency systems where an initiative has an impact on or involves more than one part of the education system
- agency-specific mechanisms for individual projects and programmes.

These governance and management systems will be based on all-of-Government guidelines and good practice with a strong emphasis on:

- ensuring robust approaches to risk, assurance and change management are in place and working effectively
- building an environment with better engagement and agreement on how we will work together
- co-design and leadership of projects and activities with end-users and the 'business owners' (wherever they may be based in the education system)
- building strong integration with broader agency and system governance structures and mechanisms
- separating investment decision-making from delivery governance, establishing programmes of work, and separating management structures from project and programme governance.



*Supported by:*  
Programme and Project Management, Enterprise Architecture and Standards

## Collaborative delivery

- The Education System ICT Board will be accountable to the Education System Stewardship Forum for delivery against the strategy and associated work programme.
- The Education System ICT Board will be chaired by the the Ministry's Chief Information Officer, with advisory services and secretariat support provided by the Ministry's IT Group.
- A shared governance model will be adopted for ICT systems and their funding across education sector agencies and the education system.
- A model will be developed for end-user and business ownership and leadership for ICT-enabled change initiatives. This will include the championing of their adoption across the education system.
- Engagement will be facilitated with education leaders for discussion and debate around future use of ICT to support learning, teaching and administration.
- Robust project and programme management mechanisms will be adopted.
- Operational systems will be maintained and supported appropriately for their full life-span.

## The strategy in depth

---

The diagram on page 18 below illustrates a conceptual framework to underpin the strategy, target states and work programme. The framework follows the enterprise architecture convention of using layers and segments as a means to separate domains and reduce complexity.

The 'business' components of the strategy are represented towards the top of the diagram while the 'technical' components are positioned at the base. Sandwiched between the two is the 'data and information' layer. This format is broadly consistent with the Government Enterprise Architecture for NZ (GEA-NZ) framework and will facilitate the use of GEA-NZ to map out a whole-of-sector architecture.

The segments and layers of the framework are described briefly below. The elements within each of these segments and layers are illustrative only and not intended to be an exhaustive representation.

### *Audiences*

These are the main stakeholders in the education system. Their perspectives and future needs, around which the strategy is constructed, are described in the vignettes that accompany the strategy document.

### *Channels*

Channels are the means by which the education system communicates and interacts with the audiences. Most involve some technology to mediate the channel. As the world becomes increasingly digital, new channels emerge and become more effective than some more traditional ones. The strategy reflects this shift.

### *Business capabilities*

This layer describes business capabilities and the business applications directly related to them. Almost all business capabilities use digital technologies in some way or will do so in the target state.

### *Data and information management*

This layer represents both the collection and management of data in sector registers and the use of a consistent set of information across the sector for reporting and analytics. The Information Commons represents the systems (data stores) outlined in the strategy to achieve this.

### *Platform and integration*

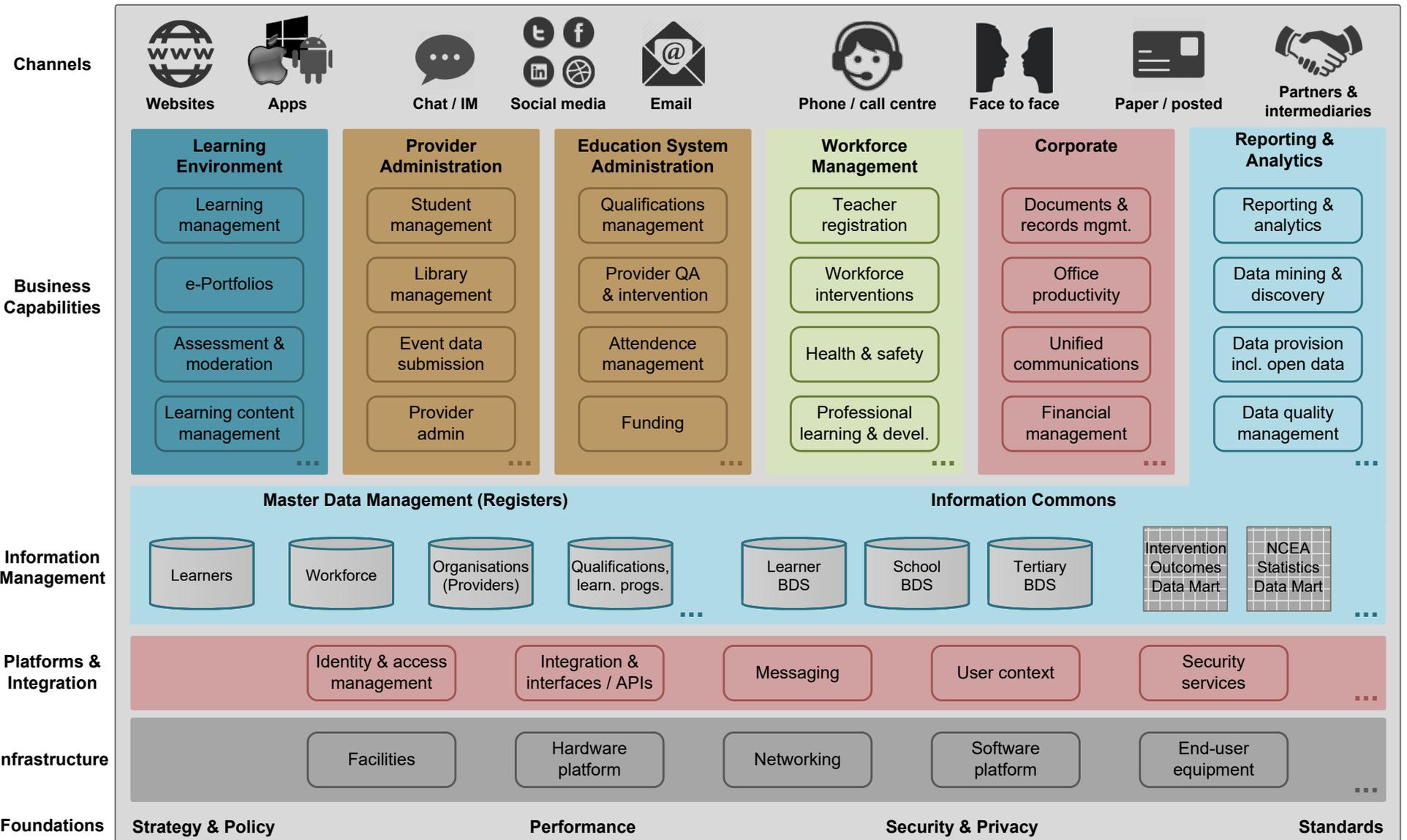
These elements represent essential technical services that support the effective delivery and integration of business applications as well as data and information management.

### *Infrastructure*

The hardware, system software and network infrastructure, and end-user devices required to support the digitally-enabled education system.

### *Foundations*

The rest of the architecture is guided by strategies and policies, and associated performance measures at a government, sector and agency level. Privacy and security regulations, directives, policies and standards ensure that information and systems are protected appropriately. Standards ensure effective design and implementation, and enable interoperability.



## Channels

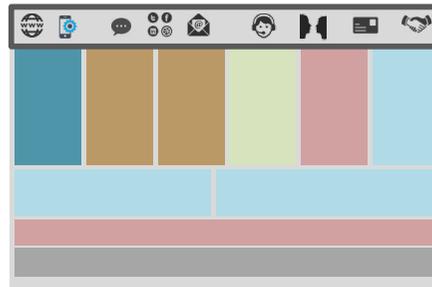
Channels are the means, both digital and traditional, through which the education system delivers its services and interacts with its customers and participants.

### Current state

- Too many websites, with agency-centric design, poor accessibility, and duplicated, inconsistent information
- Multiple call centres, with resourcing challenges and variable ability resolve calls at first point of contact
- No single view of the learner/client and limited ability to switch channels during an interaction
- Customers often have to provide the same information to multiple agencies to complete a business process
- Data collection often requires manual handling, which is resource intensive and prone to error
- Many transactions are still completed on paper or not captured and systematically managed (e.g. calls direct to specific staff).

### Strategy

- Establish **shared governance** of channels organised around consumer needs
- **Consolidate** channel delivery focussing initially on service discovery information
- **Eliminate unnecessary** transactions and manual handling (e.g. via system integration)
- Move paper transactions to **digital channels**, and provide traditional alternatives via partners where required



- Move low complexity and low value transactions to **self-service** channels to reduce unit cost; re-focus call centre and face-to-face on high value interactions
- Establish a shared **service design capability** to ensure delivery is customer focused and integrated across agencies
- Extend and strengthen **client relationship management** practices and support with appropriate technology
- Leverage **collaboration technology** for face-to-face interaction to reduce travel and regional support costs
- Design websites to be **responsive, accessible** and **multi-lingual**, and support with native mobile applications only where there are sufficient benefits
- Provide **open data** and **APIs** to enable innovative delivery by partners and intermediaries, and use these to support our own digital channels.

### Target state

- Service delivery is primarily via self-service, digital channels with seamless assistance available when required
- Shared channels are structured around the needs of the service consumer not agency structures. Information and services are easy to find and use
- Clients are able to use digital channels that suit their needs and move between channels without losing context
- Service delivery is integrated so that customers can complete an interaction efficiently
- There is no unnecessary duplication of information and channels
- There is clear ownership and active management of channels and content.

## Learning environment

This segment covers all education system capabilities that directly interface with the learner, educator and family. Collectively these capabilities and systems are part of the learning environment.

The learning environment encompasses:

- management of learning
- learning content and teaching materials
- lesson planning and learning activity development
- diagnostic, formative and summative assessment
- learning collaboration and communication
- recording student work and achievement
- management of student information
- career information, advice and guidance
- interactions between education leaders / practitioners and parents / family / whānau.

### Current state

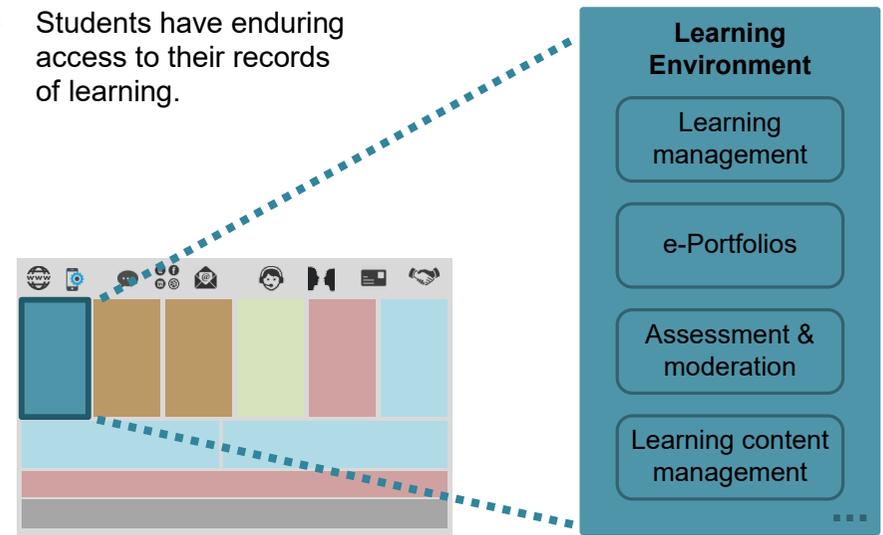
- Digital enablement of the learning environment is highly variable across the system and solutions are often poorly integrated
- Assessment data is not always available when and where it is needed to influence student learning
- Student records and portfolios do not persist across education establishment boundaries
- Much of the system is organisation-centric rather than learner-centric
- Managing learning technology is a significant overhead for providers.

## Strategy

- Invest in a truly **learner-centred** education system in which digital technologies amplify the variety of learning experiences available to students
- Implement a truly **universal Record of Achievement**, and **standardise core e-Portfolio** functionality
- Provide **platform and integration services** to support diversity and personalisation
- Support the effective **governance** of digital learning environments and work collaboratively with sector-led forums
- Adopt a joint approach to **digital assessment**
- **Maximise digital inclusion.**

### Target state

- Digitally-enabled and integrated learning environments allow anytime, anywhere learning and assessment
- Equitable access to digital learning opportunities and resources narrows the digital divide
- Students have enduring access to their records of learning.



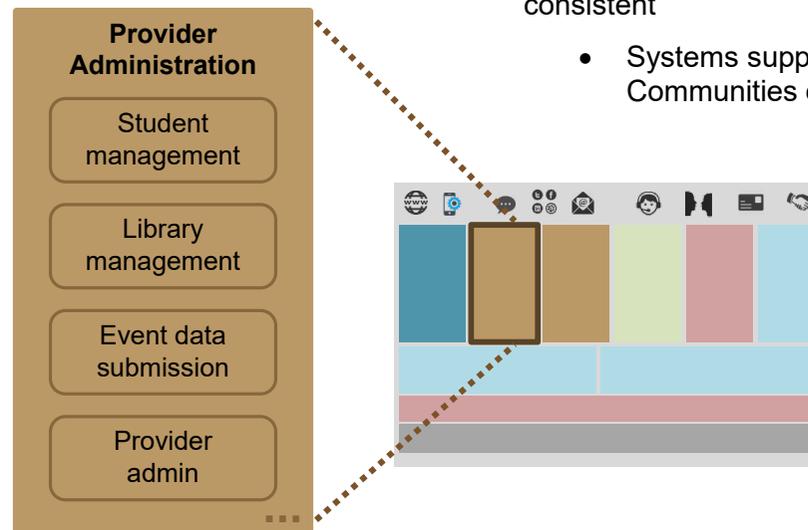
## Provider administration

This segment covers all aspects of education sector provider administration functions and activities. Provider Administration includes:

- student management, including provider and programme enrolment, attendance and timetabling
- recording of assessment and achievement
- examination centre management
- pastoral care
- behaviour management
- back office functions and facilities management.

### Current state

- There are multiple and in some cases aging or incomplete student management systems and back office systems
- There are few agreed interoperability standards for administrative system integration and student data transfer
- Business processes vary significantly across providers
- Agency data collection is duplicated, inconsistent and time-consuming
- Systems are not cloud based
- System support for collaboration within Communities of Learning is limited.



### Strategy

- Use **digital** technologies and best-practices to **simplify and streamline** administration functions and agency data collection
- Actively support and enable **safe adoption of cloud** services
- **Standardise core SMS** functionality and data with open APIs to value-add services and back-office applications
- Implement **event-based data collection** to improve timeliness and reduce workload
- Create a **transparent funding model** for schools ICT via the operations grants.

### Target state

- Providers are easily able to adopt integrated cloud-based services to meet administration needs
- Education interoperability standards allow transfer of learner and assessment information
- Business processes for administration are well-defined and consistent
  - Systems support effective collaboration within Communities of Learning
- Data flows automatically to agencies
- Core student data is managed centrally on behalf of the education system.

## Education system administration

This segment covers those business capabilities that are unique to particular agencies. Education system administration capabilities include:

- qualifications, learning programme and standards management
- provider quality assurance and interventions
- student interventions
- system level enrolment, attendance and truancy management
- provider performance planning, monitoring and reporting
- early childhood, compulsory, tertiary and research funding
- property management and schools transport
- administration of examinations.

### Current state

- There are siloed systems, diverse technology platforms, and many aging legacy business applications
- There is no single view of provider and student information
- No real differentiation exists between common interests and unique areas of work
- Data collection is duplicated, inconsistent and time-consuming.

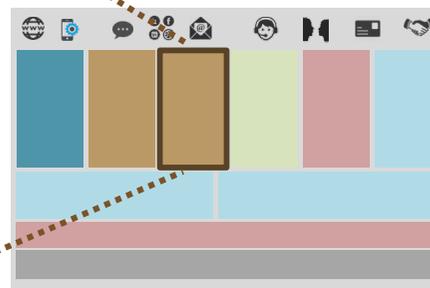


### Strategy

- Agree upon **standards** and define interfaces to **support integration**
- **Model business capabilities** across the education agencies and use this to identify opportunities for information sharing, alignment across sectors and system consolidation
- Manage business **applications as a single portfolio** to reduce duplication, improve reuse and co-ordinate investment
- Adopt **shared case management practices** and technology to enable better outcomes for provider review, service and interventions, and student service and interventions.

### Target state

- A joined-up approach to information management supports better business outcomes
- Education system data is available on demand
- Integrated agency systems support multiple business needs cost-effectively
- Capability and governance frameworks are in place to ensure alignment.



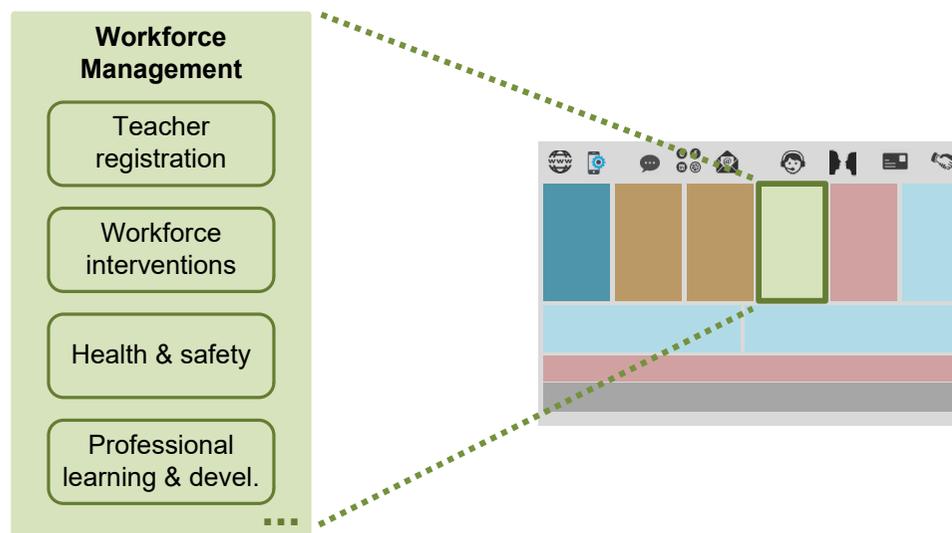
## Workforce management

This segment covers all aspects of the management of the education workforce. *This segment will be reviewed with the Education Council when it is fully established and operational.* Workforce management includes:

- education provider and agency staff and contractors
- teacher registration
- education workforce recruitment and employment
- education payroll
- workforce safety checks to ensure vulnerable children are protected
- workforce interventions
- workforce health and safety
- professional learning and development.

### Current state

- There are different processes and requirements for registration, recruitment and employment for teaching and non-teaching staff
- There is no coherent overview of employee information i.e. workforce records are siloed
- There are multiple systems for managing workforce interventions.



## Strategy

- Define **standards** and interfaces to **support integration**
- Implement an education **workforce register**
- Adopt **shared case management practices** and platforms to enable better outcomes for workforce processes and interventions.

## Target state

- Information systems support standardised workflows for registration, recruitment, remuneration and professional development
- A joined-up view of education workforce participants is in place
- Staff can access their information online
- With the consent of staff, providers can view and update shared workforce records
- Education agencies and providers have better information for forecasting, budgeting and reporting.

## Corporate

This segment covers those business capabilities that are related to administration of the agency itself and are common across all organisations. Corporate business capabilities include:

- financial management, procurement and contracts
- document and records management
- unified communications including telephony
- ICT services
- office productivity and collaboration.

Human resources management is addressed in the Workforce management section on page 23 above.

### Current state

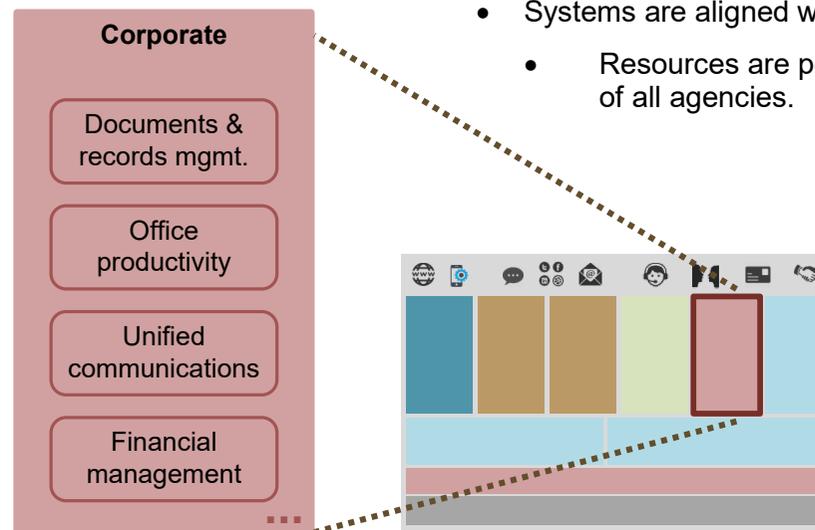
- Systems and processes vary widely across agencies with unnecessary costs and complexity
- There is duplicate, siloed information across agencies
- Few tools support effective inter-agency collaboration
- There is significant reliance on paper, or inefficient electronic versions of paper based processes.

## Strategy

- **Aggregate demand** across education agencies to drive down cost of provision
- **Standardise and digitise** back-office processes and **consolidate systems**, ensuring cost profile is acceptable for smaller agencies
- Leverage **common capabilities** (and implement these where required)
- Invest in systems to **support effective inter-agency collaboration** (e.g. shared intranet, phone lists, organisation charts, messaging, project and team collaboration tools).

### Target state

- Streamlined, efficient processes and consolidated systems are in place for sector agencies including common finance, communications and office productivity systems
- The unit cost for commodity provisioning is significantly lower
- Systems actively support inter-agency collaboration
- Systems are aligned with AoG requirements
  - Resources are pooled and managed on behalf of all agencies.



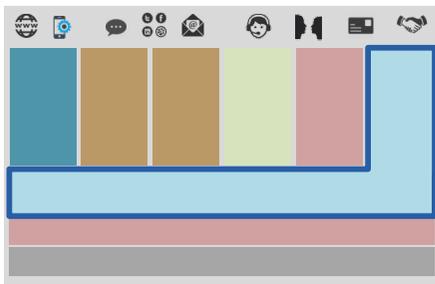
## Data and information management

This segment covers data and information management capabilities and concerns, including the Information Commons platform. Data and information management includes:

- common data models and definitions
- master data and data quality management
- reporting data stores and data marts
- reporting and analytics toolsets
- data mining and discovery
- dataset provision (raw data access) and open data.

### Current state

- Some registers exist but master data is not adequately managed. There is a proliferation of siloed data stores, and duplicated, inconsistent toolsets
- There is no universally agreed common data model and there are limited common data definitions
- Information is difficult to access for non-technical users
- Minimal structured data is available on learning activity, assessment and the effectiveness of learning content
- There is limited availability of open data in machine readable formats.



### Strategy

- **Measure and improve information management maturity** across the system using accepted good practice
- Consolidate **master data management** for shared data
- Implement **centralised reporting data stores** fed by automated data feeds to meet all agency reporting needs
- Implement **common BI tools** and repositories for obtaining high-quality, timely information on all aspects of the education system from the centralised data stores
- Drive the **proactive release** of high value **non-personal data** in open standards based, machine-readable formats, licensed for re-use
- Establish **shared governance** and common operational **management** of shared data and Information Commons
- Establish a shared **competency centre** for all sector **business intelligence** needs
- Assess the opportunities for **learning analytics** to enable a highly adaptive, dynamic system, capable of responding to the needs of learners in real-time.

### Target state

- There is effective master data management and active data quality management
- Information Commons enables high quality, consistent reporting and analytics across the education system agencies
- Non-personal data is available in open, machine readable formats licensed for re-use
- The availability of granular learning activity data revolutionises our ability to improve the quality and relevance of digital learning resources
- Resources are pooled and managed on behalf of all agencies.

## Platforms and integration

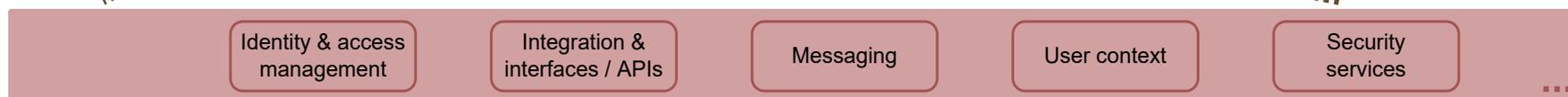
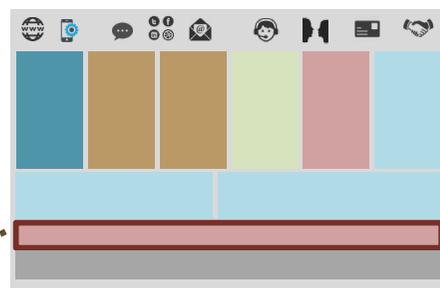
This segment covers common ICT services that support business capabilities and applications in the vertical segments as well as data and information management.

Platform services include:

- identity and access management
- integration and interfaces/APIs
- messaging/data transfer
- user context (e.g. role, location, provider, class)
- consent management
- security services (e.g. encryption, security controls).

### Current state

- There is ad-hoc and/or localised implementation of systems for which all agencies have a common need
- Integration is difficult because of a lack of standards and platform services
- Provisioning across multiple services is difficult.



## Strategy

- Implement **common platform services** to support access, interoperability and security for all education participants
- Leverage identity, format and protocol **standards to ensure interoperability** without constraining innovation. Adopt GEA-NZ or internationally accepted open standards where feasible. Work with sector groups to develop local education specific standards where necessary
- Implement **delegated management tools** for providers to manage across multiple services
- Adopt **modern application design** approaches to enable digital business models and cloud based delivery.

### Target state

- Well-defined and specified common platform services and interoperability standards are widely adopted
- There is consistent and robust implementation of cross-cutting concerns
- Administration for platform services is appropriately delegated through self-service interfaces
- Platform services and applications provide comprehensive published APIs to support interoperability
- A security competency centre supports effective security across the system
- Resources are pooled and managed on behalf of all agencies.

## Infrastructure

This segment covers the physical computing environment that supports all other ICT systems and services.

Infrastructure includes:

- facilities
- hardware platform
- networking
- system software
- end-user devices
- database management software.

### Current state

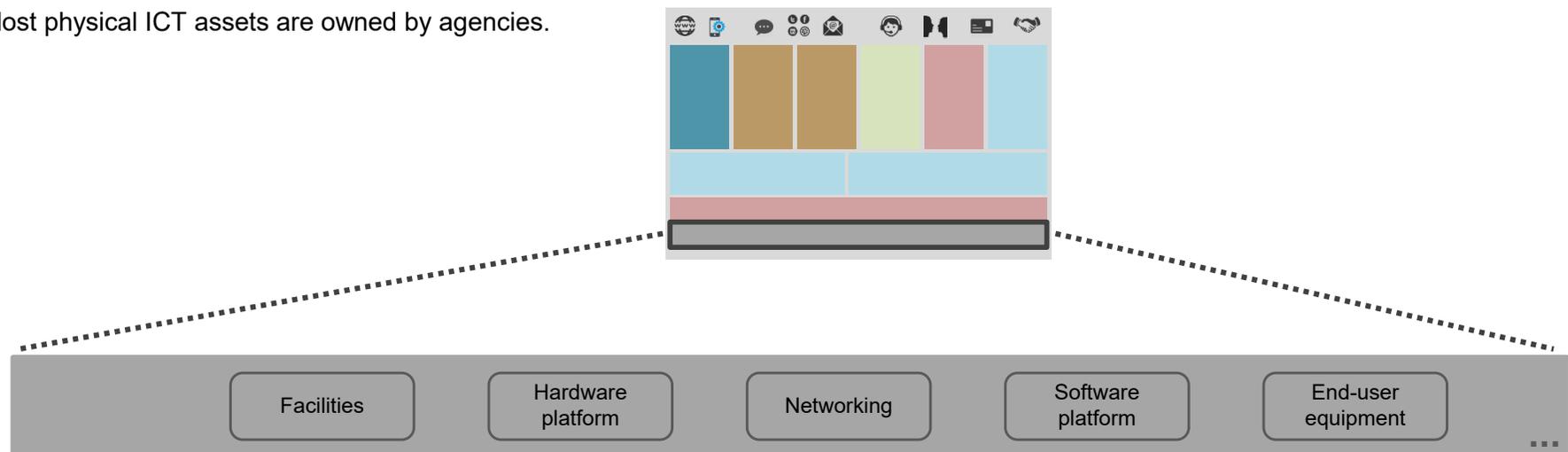
- There are multiple in-house/local environments
- Technology investment is fragmented
- There are many operational and security barriers to sharing services and infrastructure
- Most physical ICT assets are owned by agencies.

## Strategy

- **Aggregate demand and consolidate delivery and operations** across agencies
- Implement **enterprise management** toolsets
- Move proactively to **adopt cloud based infrastructure.**

### Target state

- Infrastructure and platforms are cloud-based, providing cost effective operation and elastic resourcing
- Agencies don't own physical infrastructure assets
- There is effective enterprise system management and capacity management
- Resources are pooled and managed on behalf of all agencies.



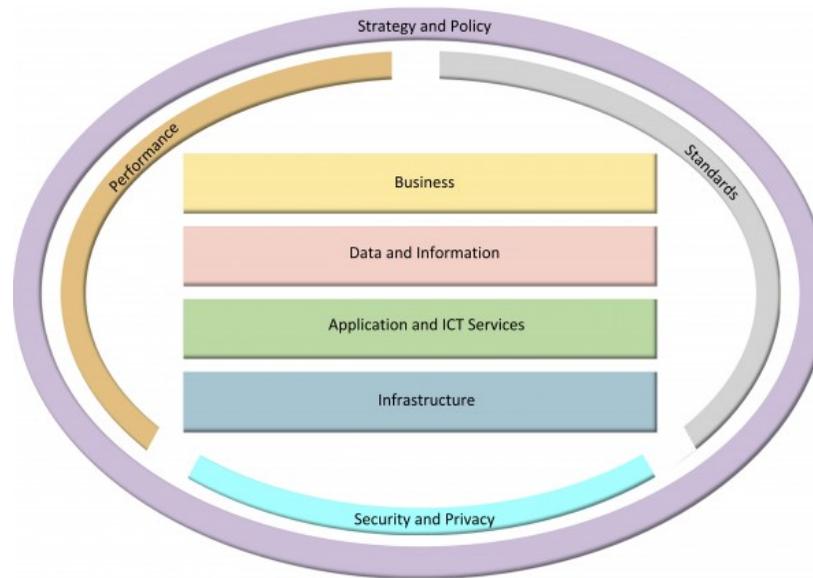
## Foundations

This segment addresses aspects that guide or support the strategy. They include the dimensions in the outer ring of GEA-NZ (shown below) as well as other key artifacts and supporting processes:

- Strategy and policy – provides linkage to strategic goals, objectives and policy
- Performance – describes targets and measures that allow monitoring of progress towards goals and outcomes
- Security and privacy – incorporates requirements, processes risk management and controls that ensure information and systems are protected appropriately
- Principles and standards that guide decision making and implementation for the other segments
- Governance model and processes
- Common approach to requirements management
- Current and target state documentation.

### Current state

- There is fragmented, ad-hoc documentation across sector
- Architectures are partially aligned with GEA-NZ
- Agency teams generally work in isolation with varied approaches
- Security practices are variable.



### Strategy

- Define a **common Enterprise Architecture framework and approach** across the education system which maps to GEA-NZ and supports development and maintenance of common approaches across agencies
- Conduct a high-level **privacy impact assessment** for the strategy
- Establish an **education information security framework** to support system-wide improvement in the management of personally identifiable information
- Establish a **single design authority** for capabilities within the scope of this strategy
- Adopt a **shared governance model** for programmes and projects within the scope of this strategy.

### Target state

- There is coherent documentation of the architecture, which is well aligned with GEA-NZ
- Education system enterprise architecture capability provides pooled resourcing across agencies
- Privacy is protected appropriately
- Information security is managed effectively across the system
- Governance models and processes are well aligned to the strategy.

# The work programme

---

To support the achievement of the strategy, the Education System ICT Board will annually prepare/update a four-year work programme.

This work will commence in May each year and be aligned with individual agency work programmes. By August a collective view will determine what initiatives should be submitted as potential budget bids for the following financial year. All potential budget bids will have supporting analysis, requirements definition and investment options prepared by the nominating and agreed lead agency.

## Fiscal environment

Proposed new investments need to have compelling value propositions, demonstrate value for money, and be able to deliver clear return on investment by either lifting educational achievement or making the administration of education more efficient.

There will need to be clear education sector governance around the strategy and associated work programme. New approaches to funding may need to be explored, that better enable the design and prototyping of innovative solutions than current procurement rules allow.

## Working together for success

The successful execution of this strategy will require a significant change to the way initiatives are governed and managed. Agencies will have to work together more than ever before, and agree on joint investments where appropriate.

Each initiative will be lead by one agency, working closely with identified partner agencies who will commit resource, actively participate in shared governance, and ensure their work programmes are aligned. Other interested agencies will be consulted as required and receive reporting via the Education System ICT Board.

## Identifying and prioritising initiatives

Proposed criteria to identify and prioritise initiatives include:

- a clearly defined problem statement and value proposition for the investment
- clear evidence of how it contributes to government or education system priorities
- relevant education system leadership, managerial support and ownership
- an impact on more than one education sector agency, or importance to the system as a whole
- solutions that are scalable, interoperable where appropriate, and based on agreed standards
- multi-provider, community, or end-user input into the solution design
- a momentum of activity or readiness and capacity within relevant organisations to support implementation
- endorsement by the senior leadership of the sponsoring education sector agency
- secured funding or a commitment to seeking funding.

Once proposed projects/initiatives are assessed against these criteria they can then be prioritised into one of the following categories: Critical (next 2 years); Important (2-5 year horizon); or Emerging (5-10 year horizon). (These timeframes are guides only).

In any given year there should be no more than 10 critical education system priority initiatives, with an emphasis on those that:

- are of high strategic and education system value and deliver improved education outcomes or administrative efficiency
- replace out-of-date or unsupported systems to create a sound foundation for the future

- deliver high value for money invested
- provide an essential platform or enabler for future high-value applications.

## Major project delivery

There have been valuable lessons learnt about major project delivery across government. These include the need to strengthen the governance and delivery of projects, and ensuring projects align with priorities across education and the broader government landscape.

Currently each education sector agency has its own ICT governance and funding arrangements. This strategy seeks to establish a more integrated planning and implementation environment across those agencies and organisations.

There is always a risk that projects are run without appropriate and meaningful engagement with the ‘end-user’ – in the education setting that can be learners, educators or administrators. This lack of collaboration and user input can hamper the utility of projects and services. A stronger emphasis on co-production is important for delivering high-quality, fit-for-purpose services and solutions.

Many schools and education providers already use technology to enhance learning and support management activities, but ICT capability is variable across the sector. While it is important to encourage innovative use of ICT, it is equally important to ensure investment is considered, evidence-based and focused on lifting educational achievement and improving learning outcomes.

## Reporting against the work programme

The Education System ICT Board will receive regular reports on progress with the strategy, covering:

- progress with the initiatives in the joint work programme
- progress towards the target states articulated in the strategy
- expenditure against the agreed investment plan

- performance relative to the GCIO Agency Maturity Framework.

Reports to the board will be:

- balanced, including both favourable and unfavourable results
- comparable, with consistent format and content across the life of the strategy
- accurate, timely, clear, and relevant, including good quality information to guide board decision-making
- reliable and traceable to ensure transparency.

Where possible work programme reports will build on existing reporting requirements, such as what is required by the Government’s GCIO. The reporting framework will be in place by end of March 2016.

Performance measures will be developed to ensure the work programme can be tracked as a whole entity. We will also adopt existing measures where relevant, such as the Agency Maturity Framework scale.