THE FUTURE OF WORK

Considerations for an education response

Derek Wenmoth,

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THE FUTURE WORLD OF WORK

1. Document Purpose

The purpose of this document is to provide perspectives on the broader context of the work, and the digital environment that today's and tomorrow's students will be entering throughout their lives and careers.

This is not a comprehensive literature review, rather, it uses a synthesis of existing reports that are publicly available both nationally and internationally to provide an overview of the factors that other jurisdictions are considering in developing digital education strategies.

2. Summary Overview

2.1   Technology has been identified as a key driver or accelerator of change in our modern world.

2.2   Governments around the world now recognise that digital technology is critical to a modern economy and public service, and that learning about and with digital technologies contributes to developing an informed digital society.

2.3   The pace of evolving technologies may prove too daunting for human acclimation to the advances being forecast. Knowing that the technological tsunami is coming is, for young people, a crucial consideration in how they choose to map out their futures.

2.4   Digital technologies have transformed the workplace, with workers across the board - from corporate finance officers to sales people to utility workers and nurses - now spending sizable portions of their workdays using tools that require digital skills and understanding.

2.5   Digital technologies have a major role to play in realising the NZ Education System's vision for lifelong learning that is inclusive, equitable, connected and future focused. They will continue to profoundly affect the way we communicate, learn, and access and use information.

2.6   It is now critically important that educational provision in New Zealand, at all levels, develops a strategic approach, and takes action to include an emphasis on the development of these digital skills and understandings to reflect the demands of the modern workplace and the expectations of modern learners.

3. Introduction

Governments around the world now recognise that digital technology is critical to a modern economy and public service, and that learning about and with digital technologies contributes to developing an informed digital society.

According to the United Nations (UN), digital technologies can help make our world fairer, more peaceful, and more just. The UN recognises that technological advances can support and accelerate achievement of each of the Sustainable Development Goals – from ending extreme poverty to reducing maternal and infant mortality, promoting sustainable farming and decent work, and achieving universal literacy. But technologies can also threaten privacy, erode security and fuel inequality. They have implications for human rights and human agency. Like generations before, governments, businesses and individuals have a choice to make in how they harness and manage new technologies.

Central to much of this is what we see happening in the world of work and employment. Government and business leaders globally are recognising the tremendous changes that have occurred and continue to occur in the world of work. Whether it's the push for more young people to enter careers as programmers or online designers, the challenge of working alongside robots or simply keeping track of inventory and office tasks using increasingly sophisticated online interfaces. Most modern economies around the world now recognise the need for a digitally-enabled workforce to remain viable, productive and competitive.

This, then, is the challenge of our current age. The nature of technological change is to amplify both the positive and the negative impacts of its use. Governments and other agencies must develop their strategies so that they can, on the one hand, embrace and leverage the considerable potential of digital technologies, and on the other, address the growing list of concerns and threats that are emerging in parallel.

In education, it is not sufficient to simply add more technology to what we do and how we do it with the expectation that somehow we will be better preparing our learners for a more technologically saturated future. Our work in this area must be deeply informed by an awareness of the broader issues and concerns that are impacting all dimensions of our lives on this planet.

In preparing our young people for their future, in particular, the ways they may contribute to shaping that future through the lives the choices they make in terms of the work they choose to do we must explore answers to the following questions:

1. What is driving this technological advance? And what are the opportunities and what concerns are being raised?
2. What will be different about the world of work as a consequence?
3. What are the implications for our current and future learners, and what are the ways that education might respond?

These questions are the focus of this paper which provides insights from the national and international literature, and from what is happening in other jurisdictions.

4. Technology as a driver of change

4.1 The promise of technology

Technology has been identified as a key driver or accelerator of change in our modern world. In Future Shock (1970), Alvin Toffler speaks of the 'technological engine' of change, arguing that 'technology is indisputably a major force behind the accelerative thrust' in the areas of change he identifies in his book.

Some 30 years later, in their book *A Future Perfect* (2000) Micklethwait and Woolridge refer to 'technology as freedom'. Written only seven years into the era of the World Wide Web, and seven years before the introduction of the smart phone, cloud computing and social media, these authors paint an optimistic view of the greater openness and connectivity the internet provides. They quote John Chambers, the then boss of Cisco systems, who said:

> *"The Internet will change how people live, work, play and learn, This Industrial Revolution brought together people with machines in factories, and the Internet revolution will bring together people with knowledge and information in virtual companies… It will promote globalisation at an incredible pace. But instead of happening over 100 years like the Industrial Revolution, it will happen over seven years."*

Such optimism is now tempered with shades of caution and even outright despair. In his book The Uninhabitable Earth (1999) David Wallace-Wells argues the case that our planet is in its dying days as a result of resource depletion and climate change, he claims that if anything will save us, it will be "Church of Technology". He then cautions about the blind faith that is being put in this view of the future, and, using developments in AI as a caution, argues that the biggest threat to technology will be technology itself.

4.2 Global Pressures

While technological change is just a part of the picture, it is a very significant part as it pervades almost every area of our future world. More than a decade ago James Canton (2007) identified the following trends that he predicted would shape what he calls the 'extreme future':

- Weird science – *what creates scepticism at first can often become our future reality*
- Future of the individual – *the protection of privacy, human rights and freedoms*
- Innovation economy – *cheaper, faster, smarter tools and services*
- Next workforce – *changing demographics, talent war, outsourcing, gig-workers*
- Securing the future – *bioterror risks, extreme pandemics, cyber terror, rogue tech etc.*
- US-China future – *the emergence of China as a global superpower, and the demise of the US*
- Globalization – *global security, terrorism, poverty, global trade, population trends*
- Fueling the future – *extreme energy trends and a new energy age*
- Longevity medicine – *living longer, better – longevity trends*
- Climate change – *public health and safety risks, threat to water and food production etc.*

In the story behind each of these trends you don't have to look far to see the pervasive influence of technology, both as a part of the problem and also, potentially, as part of the solution.

The World Economic Forum (2018) identifies four specific technological advance that are set to dominate the 2018–2022 period as drivers positively affecting business growth.:

- Ubiquitous high-speed mobile internet;
- Artificial intelligence;
- Widespread adoption of big data analytics; and
- Cloud technology

Across the world there is growing agreement among various thought leaders, politicians and futurists that accelerating technologies are quietly and pervasively transforming the world in which we live, work and play. The pace of evolving technologies may prove too daunting for human acclimation to those advances. Knowing

that the technological tsunami is coming is, for young people, a crucial consideration in how they choose to map out their futures.

The US military has referred to this as a VUCA[1] world, characterised as follows:

V = Volatility: the nature and dynamics of change, and the nature and speed of change forces and change catalysts.

U = Uncertainty: the lack of predictability, the prospects for surprise, and the sense of awareness and understanding of issues and events.

C = Complexity: the multiplex of forces, the confounding of issues, no cause-and-effect chain and confusion that surrounds organization.

A = Ambiguity: the haziness of reality, the potential for misreads, and the mixed meanings of conditions; cause-and-effect confusion.

Contributing to this pressure are accelerating changes in key areas, including:

- Accelerating technological change, including in areas such as artificial intelligence.
- Political instability, including increases in cyber terrorism and cyber-safety breaches.
- Globalisation, threatening the survival of nation states and putting economic power in the hands of individuals or corporates.
- Climate change, now referred to by the United Nations as a climate emergency, with significant threats to our survival on the planet.
- Biodiversity loss, noting the decline in the number, genetic variability, and variety of species, and the biological communities as a result of human activity.

4.3   4th industrial revolution

A number of writers refer to this age of accelerating technological advance, including the fusion of advances in artificial intelligence (AI), robotics and the Internet of Things (IoT) as the Fourth Industrial Revolution. According to the World Economic Forum (WEF)[2], the Fourth Industrial Revolution represents a fundamental change in the way we live, work and relate to one another. WEF describes it is a new chapter in human development, enabled by extraordinary technology advances commensurate with those of the first, second and third industrial revolutions.

In their 2018 report on the Future of Jobs[3], WEF identified four specific technological advances—ubiquitous high-speed mobile internet; artificial intelligence; widespread adoption of big data analytics; and cloud technology— that are set to dominate the 2018–2022 period as drivers positively affecting business growth, and as a result, the nature of jobs and the world of work into the future.

Friedman (2016) sees this change as the result of the forces unleashed by globalization and a digitally networked world, merging with human-driven climate change to create a perfect storm of unintended, and mostly negative, consequences, with the most profound effects being felt in the most vulnerable countries and communities. He argues that the rate of change, both technological and social, enabled by this connectivity now exceeds our ability to adapt, causing many of our current political, economic, and sectarian challenges. Friedman does, however, paint an optimistic view of what might be achieved if we can work together to make significant changes in the way we live, learn and earn into the future.

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[1] https://en.wikipedia.org/wiki/Volatility,_uncertainty,_complexity_and_ambiguity

[2] https://www.weforum.org/focus/fourth-industrial-revolution

[3] http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf

5. Future world of work

Throughout history technological revolutions have changed the nature of work and requirements of workers. Each wave of technological change has created new forms and patterns of work, making others obsolete, and leading to wider societal changes. The current digital revolution will have similar, profound impacts.

According to the United Nations[4], digital technologies have advanced more rapidly than any innovation in our history – reaching around 50 per cent of the developing world's population in only two decades and transforming societies. The impact has been realised in a number of major sectors over the past 20 years, including media, climate action and healthcare (Hillyer, 2020).

In 2016, the World Economic Forum in Davos, Switzerland, published a briefing paper that stated:

> *In many industries and countries, the most in-demand occupations did not exist 10 or even five years ago, and the pace of change is set to accelerate. By one popular estimate, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist.*

The McKinsey Global Institute (Dec, 2017) suggested that 800 million people could lose their jobs to automation by 2030, while polls such as the Edelman Trust Barometer (2019) reveal that the majority of all employees worry that they do not have the necessary training or skills to get a well-paid job.

Similar predications are made in a range of reports and papers, and given that the generation referred to in that paper will soon be starting secondary school, the urgency of a response cannot be understated.

In a Brookings Institute report Munro et. al. (2017) present a detailed analysis of changes in the digital content of 545 occupations covering 90 percent of the U.S. workforce in all industries since 2001. The report revealed that workers across the board - from corporate finance officers to sales people to utility workers and nurses – are spending sizable portions of their workdays using tools that require digital skills. The writers note that digitalization is associated with increased pay and job resiliency in the face of automation but also vastly uneven trends for job growth and wages. Sharp gender- and race-based challenges were also revealed.

Views on the pace and scale of this digital disruption do vary, however. The recent NZ Productivity Commission report (2021) states:

> *Worries about accelerating technological change and imminent, widespread disruption also appear misplaced. It is difficult to measure technological change directly. But the available proxy indicators, including productivity growth, business start-up rates and occupational churn, do not show faster technological progress and adoption across the developed world.*

The writers of the NZ Productivity Commission's report believe New Zealand is well-placed for faster technology adoption in some respects, but not in others. They note that by international standards, adult New Zealanders are skilled and train at high levels and that New Zealand's labour market has historically done a good job of creating lots of jobs. On the other hand, they observe that core skill levels in NZ schools are dropping and that New Zealand's business environment lacks dynamism.

In a survey conducted by the NZ Digital Skills Forum (2020) respondents were asked to list the specific job roles they are currently recruiting and the number of people for each role. The responses are illustrated below in an image taken from the report:

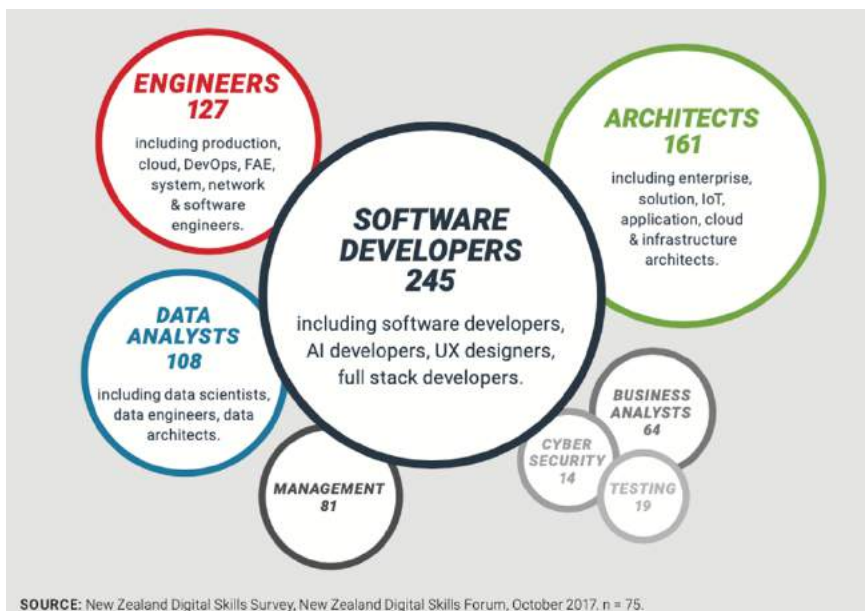---

[4] https://www.un.org/en/un75/impact-digital-technologies

ENGINEERS 127
including production, cloud, DevOps, FAE, system, network & software engineers.

SOFTWARE DEVELOPERS 245
including software developers, AI developers, UX designers, full stack developers.

ARCHITECTS 161
including enterprise, solution, IoT, application, cloud & infrastructure architects.

DATA ANALYSTS 108
including data scientists, data engineers, data architects.

BUSINESS ANALYSTS 64

CYBER SECURITY 14

TESTING 19

MANAGEMENT 81

SOURCE: New Zealand Digital Skills Survey, New Zealand Digital Skills Forum, October 2017, n = 75.

Fig.1 – Number and type of roles currently needs (from NZ Digital Skills Forum Survey, 2017)

Respondents were asked to estimate the number of people they expect to be employing in each of the different digital skills areas within the next two years. Across 121 firms, they collectively forecast employing an additional 3,248 digitally skilled employees within two years, 38% of which will be software programmers. Other skills in demand will be data analysts, architects, application and infrastructure administration and support, and digital leadership.

These findings are consistent with the case made for the development of a separate Digital Technologies Curriculum, introduced into New Zealand Schools in 2016 to develop students' broad technological knowledge, practices and dispositions that will equip them to participate in society as informed citizens and provide a platform for technology-related careers.

Amid all of the speed, innovation and change one challenge in particular has the potential to enhance or destroy the future economy. That is the coming talent war as companies, organisations and countries compete to attract skilled workers for the digital economy. Global talent shortages are identified as a top driver of competitive advantage, pitting nations, individuals and companies against one another as the talent grows increasingly scarce. According to Canton (2007), the workforce crises that arise in the near future, and indeed are now experiencing, will be traceable to the lack of skilled workers.

Another concern is that too many jobs are being destroyed too quickly and new jobs are not being created fast enough, or to put it more bluntly in the words of some writers, the robots are taking over.

Victoria MacLennan, Chairperson of the NZ Digital Skills Forum highlights how we are starting to experience the impact of digitisation, robotics and automation in our everyday lives. She notes also that some businesses are realising productivity gains through replacing repetitive manual activities and automating human centric calculations, other business models are facing rapid disruption and obsolescence - from taxis to retailers and clinical diagnosis. (NZ Digital Skills Forum, 2020)

While it is undeniable that technology is significantly impacting the traditional structures and requirements of many jobs, new opportunities are also being exposed and explored. This point was one of the key findings in the NZ Productivity Commission's report (2021) that concluded technology doesn't just replace jobs, it also creates them, concluding predictions that technology will inevitably replace work are simplistic and out of step with historical experience.

An important thing to consider here is that the jobs and ways of working that we'll see emerge into the future won't simply be as a result of the new applications, robots, interfaces etc. that we see developed. A lot will occur as a result of the, often untended, consequences of our insatiable appetite to embrace these things.

For example, the International Labour Organization (ILO, 2021) estimates that the shift to a greener economy could create 24 million new jobs globally by 2030 through the adoption of sustainable practices in the energy sector, the use of electric vehicles and increasing energy efficiency in existing and future buildings.

The UN report on the impact of digital technologies notes that the International Labour Organisation estimates that the shift to a greener economy could create 24 million new jobs globally by 2030 through the adoption of sustainable practices in the energy sector, the use of electric vehicles and increasing energy efficiency in existing and future buildings.

NZ born Kinley Salmon agrees. He emphasises that technology is not something that just happens to humans, but is shaped by choices we make. Now working as a Washington-based economist who has previously worked as a consultant with McKinsey and Co. and has written for the Economist, Salmon argues that growing economic output, which we need to realise is inevitable in a world of high employment and growing productivity, has historically also meant growing environmental damage. We can no longer continue to disregard the state of our environment, he says, as we are up against real planetary boundaries. (Salmon, 2019)

Another issue becoming apparent here are the growing divides that are appearing within our society. The digital divide was once regarded as the separate between those who have access to the technology and those who don't. As access issues are addressed, however, we see evidence of other divides, such as the level and nature of use etc. According to Digital equity coalition Aotearoa[5], digital equity exists when everyone can access and effectively use digital technologies so as to participate in our society, democracy and economy.

These challenges raise essential questions about the precarious nature of jobs, the support available if people are unable to work or retire, the skills we need for current and future jobs, the quality of those jobs, and what voice people have in shaping these outcomes.

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[5] https://www.digitalequity.nz/

6. The skills required

Mercer (1998) claims the symbol of the modernist period was the production line, where dehumanised workers were driven by, and almost became part of, the machine. Now the move to the information society, and the parallel move to service work, means that the individual – using his or her intelligence flexibly – has become the prime generator of added value. Thus, the individual has become the most important investment, especially in terms of the education and training they have received. He goes on to say;

> *The greatest freedom to emerge as the twenty-first century progresses will be that of individuals to choose the pattern of their lives to match their exact needs – unrestricted group culture. The new richness of these lives maybe described as portfolio lives – a unique combination of lifestyles for each individual. (Mercer, 1998)*

A new generation of students requires different skills from the generations that came before.

So what are the skills and competencies that the modern workforce requires, and which we should be focusing attention on to ensure our current cohort of secondary school students are equipped with as they prepare to leave school?

Over the past two decades there has been a steady stream of publications listing the skills and capabilities that young people need to learn to allow them to function effectively in the modern world and the modern workplace. Over time these lists have evolved and lengthened as the imperatives for their development have become more recognised.

In 2018 the World Economic Forum published its *Future of Jobs* report in which they identified the top ten skills they believe young people should be developing as they prepare for the future of work. The report outlines a predicted shift in the skills being considered important in just a five year period from 2015 to 2020, illustrating the pace of change and its impact on employment demand.

In 2015	**In 2020**
1. Complex problem solving	1. Complex problem solving
2. Coordinating with others	2. Critical thinking
3. People management	3. Creativity
4. Critical thinking	4. People management
5. Negotiation	5. Coordinating with others
6. Quality control	6. Emotional intelligence
7. Service orientation	7. Judgement and decision making
8. Judgement and decision making	8. Service orientation
9. Active listening	9. Negotiation
10. Creativity	10. Cognitive flexibility

Source – Future of Jobs Report, World Economic Forum (2018)

What is significant about these lists is that while they comprise, for the most part, the same skills but in different order, the priority given to the teaching and assessment of these skills in our current education system is given less priority than the tradition forms of academic assessment and measurement.

A more recent report from the World Economic Forum (January, 2020) titled *Schools of the Future: Defining New Models of Education for the Fourth Industrial Revolution*[6] outlines how education needs to change if we are to succeed in preparing our young people for the future. According to this report the top skills and skill groups which employers see as rising in prominence in the lead up to 2025 include groups such as critical thinking and analysis as well as problem-solving, and skills in self-management such as active learning, resilience, stress tolerance and flexibility.

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[6] http://www3.weforum.org/docs/WEF_Schools_of_the_Future_Report_2019.pdf

The report goes on to identify eight "critical characteristics in learning content and experiences" that they argue are necessary for all young people to be learning today, and should form the basis of a contemporary education system:

1. Global Citizenship skills
2. Innovation and creativity skills
3. Technology Skills
4. Interpersonal Skills
5. Personalised and self-paced learning
6. Accessible and inclusive learning
7. Problem-based and collaborative learning
8. Lifelong and student-driven learning

While time could be devoted to expanding on each of the characteristics in this list, the first is worth a special mention given the global context within which our current generation of learners will find themselves living, learning and earning.

In a post titled Five Reasons Why Global Competence Matters[7], the Asia Society reports that boundaries— literal as well as figurative— are shifting and even disappearing altogether. The culture that once lived halfway around the world now lives just down the block. The ability to thrive in this new and rapidly changing environment is grounded in a globally focused curriculum.

The importance of developing global competence was recognised more formally when PISA introduced its global competence measures[8] in 2018 as an expansion of its international reporting on performance in basic areas of literacy, numeracy and science. The global competence assessment measures students' capacity to examine local, global and intercultural issues, to engage in open, appropriate and effective interactions with people from different cultures, and to act for collective well-being and sustainable development.

Over the past decade or so there has been a steady stream of development of such lists, some developed by employer or industry groups to illustrate the specific skills and abilities required to operate effectively in these new work environments, and others by national or international groups seeking to establish a new focus for curriculum design that is 'fit for purpose' in the 21st century.

The early work on this was done by the OECD which first published its "four C's" around the turn of this century. This work had a significant impact on the early development of the New Zealand Curriculum which identified five key competencies as the foundation of its curriculum design.

Further examples include the New Pedagogies for Deep Learning (NPDL)[9] work of Michael Fullan and colleagues, a project that has spread internationally, and which adds character and citizenship to the original OECD list to create a list of 6Cs.

More recently various groups have attempted to group or categorise these skills into frameworks used to guide the development of curricula at a national or school level. Partnership for 21st Century Skills[10] developed the The 21st Century Skills Framework in 2019 (illustrated below) that has been used widely in the US.

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[7] https://asiasociety.org/education/global-competence-outcomes-and-rubrics

[8] https://www.oecd.org/pisa/innovation/global-competence/

[9] https://deep-learning.global

[10] https://www.battelleforkids.org/networks/p21

At the top of the arch are the skills identified in so many other skills lists, but to this has been added the fundamental information, media and technology skills required to enable citizens to function effectively in a digitally enabled world (in purple), while to the left are the life and career skills that will ensure the individual has the inter-personal capabilities and ability to be adaptable in changing circumstances (in dark green). The lighter green arch then defines the learning areas (subjects, content, themes) that would form the basis of a school or national curriculum to create the context in which these skills are learned/developed. The bottom row of this framework provides guidance in terms of the implementation strategies to use.

Fig.2 - 21st Century Skills Framework

Perhaps the most comprehensive research to date into the skills and dispositions that our young learners will require for the future is provided by the McKinsey (2021) research that identified 56 foundational skills required will help citizens thrive in the future of work. These are divided into four categories: Cognitive, Interpersonal, Self-leadership, Digital. A breakdown of these is illustrated below, with a range of distinct element of talent (DELTAs) listed under each:

Fig.3 – Foundational Skills Required to Thrive in the Future of Work

The further breakdown of the DELTAs under separate headings within each quadrant provides an additional way of thinking about how to address the development of these skills within the context of the curriculum.

7. Education's response

7.1 Our system needs improvemoth and change

It is clear that education has an important role in preparing young people to live and thrive in the world of the future.

It is equally clear that this preparation cannot be left to chance or as a 'responsive' (re-)action as the (urgent) need arises. Instead, we need to be 'pro-active' and intentional about how these are developed in order to ensure our young learners are active in not only securing jobs and opportunities into the future, but are active in actually shaping what that world will be like.

There is broad agreement that managing the emerging digital technology trends will require changes in our approach to education, for instance, by placing more emphasis on science, technology, engineering, and maths; by teaching soft skills, and resilience; and by ensuring that people can re-skill and up-skill throughout their lifetimes.

But not everyone appears confident about their ability to re-skill or up-skill in this way. With groups such as McKinsey (Dec, 2019) suggesting that 800 million people could lose their jobs to automation by 2030, polls (Edelman, 2019) reveal that the majority of all employees worry that they do not have the necessary training or skills to get a well-paid job.

The NZ Productivity Commission (2021) identified our schooling system as an area of weakness when it comes to NZ's ability to respond to the challenge of a digitally-enabled future. The report notes that that our current system exhibits declining performance in core skills and produces persistently poor outcomes for some young people, especially children in socio-economically disadvantaged communities, and Māori and Pasifika students

The Commission's draft report titled *Educating the Future Workforce* (January, 2020) focused on how the New Zealand education system could better prepare young learners for a world of work that, while possibly no more uncertain and changeable than past or current labour markets, will undoubtedly be different. The report states:

> *It's not simply about educating our young people with the skills and knowledge they need, the education system itself must be transformed. [We must] urgently address the performance of the school system. Schooling that leaves a significant share of New Zealander with poor skills will leave them ill-prepared to succeed in the future.*

This idea is reinforced in section 1 of the NZ Productivity Commission's final report titled *Technological change and the future of work* (March, 2020) which states:

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

The report further states;

> *[NZ must] urgently address the performance of the school system. Schooling that leaves a significant share of New Zealanders with poor skills will leave them ill-prepared to succeed in the future.*

A recent OECD podcast[11] featuring an interview with Wendy Kopp, CEO and Co-Founder of Teach For All, Roberto Benes, Director of Generation Unlimited, and Andreas Schleicher, Director of the OECD Directorate for Education and Skills highlights this as a concern. The speakers note that…

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[11] https://soundcloud.com/oecdtopclasspodcast/episode-25-will-the-coronavirus-crisis-lead-to-a-fundamental-change-in-education

Coronavirus has rapidly accelerated society's increasing reliance on technology, and any sector entrenched too deeply in the old industrial work organisation risks getting left behind.

The panel discusses whether education one of these industries, and how the crisis has exposed ways in which education simply isn't up to date with the modern world?

As we consider how education must change and adapt therefore, it is imperative that we consider the changing demographics of learners and graduates as well as the expectations of employers as we design new curriculum, new spaces for learning, and different pedagogical approaches.

7.2   Thinking beyond just jobs

Educating for the future must be about more than preparation for the workplace. We know, for example, that our future workforce will need to be equipped to address the issues of climate change and the impact on the environment that we have had after years of exploitative industrial practices, together with increasing population density. The jobs of the future will not only have a technological focus, but must also support our growing emphasis on being 'green'.

This will require revising our curriculum and approach to ensure our young people are adequately prepared for this. Victoria Masterson (Aug, 2021) of the World Economic Forum identifies the following skills our young people will need for the green jobs of the future:

- Science skills
- Architectural and planning skills
- Green engineering and tech skills
- Agriculture skills
- Environmental justice skills
- Systems skills

To see these things develop suggests we must explore a lot more inter-disciplinary approaches to how we organise learning, ensuring there is cross-over between different areas of knowledge and practice that might create opportunities for new systems thinking and new solutions design.

7.3   Digital Fluency must be a focus

Across all areas of research about the future of work and education it is clear that digital technologies must be a key part of our educational focus, both in providing the tools and means for learning and also the context for learning.

According to the United Nations (2020), digital technologies have advanced more rapidly than any innovation in our history – reaching around 50 per cent of the developing world's population in only two decades and transforming societies. The UN further stresses that by enhancing connectivity, financial inclusion, access to trade and public services, technology can be a great equaliser, helping fulfil the vision of a democratic society.

These concerns are the focus of governments and education systems across the world. While the responses vary, the focus remains the same – improving opportunities for learners to gain the skills, dispositions and competencies that will allow them to function and contribute effectively in an increasingly digital world.

The overview of what is happening in different states of Australia in the following section illustrates the strategic approaches being taken there.

7.4 Strategic action across the Australian States

7.4.1 Education Victoria

The use of ICT/digital technologies is a mandated component of the Victorian Curriculum F-10 and must be substantially addressed by every school in their curriculum program(s). All Victorian government schools must have a school-based policy that provides a rationale for and describes the use of ICT/digital technologies in the school, including the internet.

Schools must take steps to ensure that the ICT/digital technologies used in the school are used in a safe and responsible manner. Digital learning in Victoria is defined as "*any type of learning that is facilitated by technology and any instructional practice that is effectively using technology to strengthen and/or transform the learning experience.*"

7.4.2 New South Wales

Here they are developing the NSW schools digital strategy – a roadmap structured over three horizons spanning seven years, building an innovative, efficient, informed, inclusive and connected school network for today's students.

The roadmap addresses service delivery, digital infrastructure, processes and platforms are extended throughout the public school network. It takes account of the transformation of the teaching and learning with digital delivery becoming fully integrated across the department, and sector-leading expertise being developed.

There's also a focus on providing equitable access to digital resources and smart devices, and the centralised provision of strategic advice based on data-driven insights.

7.4.3 Queensland

Queensland's Digital Education Strategy recognises that modern education systems are evolving towards personalised, collaborative and integrated learning experiences for the digital generation, and that progressively more learning is taking place online or is supported through online activities. Five key areas:

- provide contemporary education we need contemporary infrastructure and devices.
- create a connected world where traditional boundaries of people, systems and distance are removed.
- provide secure access to partners, data, applications and services extending our collaborative partnership opportunities with third parties and their online services
- provide educators new ways to engage and excite learners, extending and enriching learning in safe ways
- engage with educators and staff to build and demonstrate digital literacy skills and competencies to enable better educational outcomes.

And to ensure all of this is supported through…

- safe and secure environments where privacy and information management are central
- innovative third-party services that integrate with our systems, and
- incorporate high-level security and information connectivity contemporary consistent user experience enabling seamless interactions.

7.4.4 South Australia

SA are currently developing a new digital strategy to replace their 2016-2020 strategy. Their new strategy will;

- set a clear vision for using digital technology across our education system.
- outline how we use digital technology to maximise student learning
- how we prepare children to learn, live and work in a digitally driven world.

The digital strategy will focus on 4 key themes:

- improving and enhancing teaching and learning
- a productive workplace
- effective data use
- alignment to broader government opportunities

This will align with the Government of South Australia's Digital Transformation Strategy that aims to increase the capability of Government to respond to changes in the digital landscape. Their strategy notes that digital transformation is not just about putting services online, it is about fundamentally rethinking services for the digital age. Services will be simple, smart and digital.

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