



Navigating the future of education

**Schools, skills and
the challenge of change**
An ISV discussion paper

The challenge of change

School principals and teachers don't need to be told that their jobs are complex and challenging. It's what they confront every day.

They are required to be knowledgeable in the subjects they teach, and experts in the way they share that knowledge. Their professional qualifications have to be constantly renewed and expanded.

Every day, they guide classrooms filled with unique individuals with differing personalities, interests, family backgrounds, abilities and aptitudes. They meet and manage the reasonable - and sometimes unreasonable - expectations of parents.

They are required to apply a curriculum and conform to the requirements of governments and regulators. They are asked to nurture rounded, resilient individuals, not just future workers. Yet at the same time, they are expected to impart skills and knowledge that will prepare students for rapidly changing workplaces, in which they will fill roles that we can't envisage and are yet to emerge. Schools are asked to mould active citizens who will contribute to their community and country.

Principals and school leaders have the added challenges of managing complex and dynamic human organisations, staffed by teachers who are as diverse as the students they educate.

Just to complicate matters, these challenges are changing and changing fast.

While education has never been a static process, this discussion paper highlights some of the emerging trends – social, cultural, economic and technological – that are influencing schools and their students.

Produced by staff from Independent Schools Victoria (ISV), it draws on the research, experiences and predictions of wide range of experts, including educators who are already adapting to the dramatic developments outlined in the paper.

Rapid change can appear daunting. Our aim in preparing this document is to encourage all those with an interest in education as they navigate in a shifting landscape.

We hope it adds to the discussion that's already engaging educators and the wider community, so we can not only identify the challenges that change creates – but act on the positive opportunities these challenges provide.



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1 Executive summary

2 Introduction

3 Learning for the global future

Fostering authentic learning

Belong, being and becoming active global citizens

Cultivating innovative learning

4 Embracing digital challenges and the technological revolution

Encouraging digital resilience and competency

Incorporating the 'right' technology in school

Big data, ethics and governance

5 Developing the workforce of the future

Educating the workforce of the future

Determining skills and achievement in the future

Career connected learning

6 The school of the future

Enabling educators of tomorrow

Using evidence-based data to enable an adaptive system

Using technology to enhance teaching

The need to reskill and upskill teachers

Cultivating an inclusive leadership for transformational change

7 Conclusion



The world is changing at an increasingly fast pace. Major economic, political, social and technological trends are affecting demand for future skills. How well are schools equipping students to meet these complex and shifting challenges?

This discussion paper considers this question. It examines current and emerging trends in education and considers how these can impact on all involved - students, teachers, school leaders and communities.

These are some of the trends and challenges highlighted in this paper:

- As the changing environment brings about differences in the way students think and learn, there is a need to shift to a student-centered approach where authentic, relevant, meaningful, active and purposeful learning is encouraged.
- Global change is at a tipping point. Students will need to be ecologically literate and think from a global perspective to become active citizens.
- In a volatile world, students will require grit and perseverance to build a higher tolerance of failure. A combination of cognitive, metacognitive, social and emotional skills, and practical and physical skills, will help students to become agents of change.
- Schools should consider a curriculum that favours real-world experiences to enable students to cope with changing requirements for work and life.
- Advances in technology do not translate into equal learner achievement, so schools will need to encourage data competency among students and teachers, evaluate the right technology to incorporate in schools to enhance learning, and manage ethical concerns arising from data and technology integration.
- To stay relevant and innovative in a digital world, schools should consider reaping the potential benefits from big data and technologies to enhance learning and make informed decisions.
- As learning practices are changing within the classroom, teachers will need targeted professional learning that facilitates innovative pedagogies and uses evidence-based data for teaching and assessing students' performance.
- Schools will need to empower senior leaders, teachers and staff by developing necessary capabilities and encouraging distributed leadership (end-to-end responsibility) to scale transformational change.
- The journey towards transformational change is neither easy nor quick, and schools should consider engaging with policy makers, researchers, school leaders, teachers, students, parents and the community to accelerate change initiatives.

Given the diversity of ISV's Member Schools, which have varied priorities, policies and cultural values, this paper challenges them to explore these trends in their own context and understand how they can impact on their school to improve education outcomes.



The paper begins by taking the student's perspective and thinking about the types of learning experiences that will be important into the future.

'The only thing we can say with absolute certainty about the distant future is that it's uncertain. It is therefore surely our responsibility as adults and educators of future generations to ensure that our children have a decent future.'

RICHARD WATSON, ON EDUCATION IN THE 21ST CENTURY

Society is changing rapidly. Our social and economic future is becoming increasingly difficult to predict, which means we are educating children for a world we cannot reliably conceive.

This has significant consequences for how and what we teach our students. There are a number of trends influencing education, including technological and informational developments, political structures and patterns of legal norms, social conditions, cultural values, economic and market factors, and population and demographic characteristics. These forces, along with wider dominating conditions, such as globalisation and the information society, are shaping the internal and external environment of schools. But while the global economy has shifted, the structure of the education system has, arguably, remained largely unchanged.

This mismatch poses an increasing problem for education systems across the world. As the role and purpose of education goes beyond preparing students for work, how can schools prepare learners for the uncertain and unscripted future, one that students will shape and define?

This discussion paper considers this question. Its purpose is two-fold:

- to outline the key trends in the external environment that will continue to influence the fundamental principles of education
- to stimulate and provoke discussion on what might need to change in schools to cope and flourish in an uncertain future.

The paper begins by taking the student's perspective and thinking about the types of learning experiences that will be important into the future. We then discuss the significant challenges that technology, data and the digital world pose for schools, and the challenges associated with educating students for a world of work that is unclear. We finish by considering changes possibly required to school structures and the education workforce to support the development of learners for an uncertain future.

There is little doubt that the changing world has influenced the nature of learning in the 21st Century. The changing environment brings about differences in the way young people think, behave and learn. It has profound effects on students and the skills they need for social and economic participation and success.

Millennial and generation Z learners have different expectations and requirements to previous generations. According to Partridge and Hallam (2006)¹, they generally value education, desire customisation and choice in their educational offerings, and want constant feedback, yet do not appreciate close scrutiny. They also typically enjoy experiential learning, and prefer information to be packaged in short, focused segments. They expect quick, direct answers and appreciate constructive feedback². In relation to the perception of teachers and parents, there is evidence that millennial students relate to them as facilitators or partners in their learning process. They see themselves in the driver's seat, determining their own learning paths and adopting a mix of resources that make the most sense to them. Learning preferences have leaned toward teamwork, experiential activities, structure, and the use of technology to foster the application of skills. Research shows that schools are moving away from the 'chalk and talk' method, placing higher importance in a learning environment that is self-regulated, active, and holistic³.

FOSTERING AUTHENTIC LEARNING

Many schools are encouraging students to learn by experiencing, doing, creating and demonstrating new skills in creative ways, as students are seen as active contributors rather than consumers of knowledge. Schools are being encouraged to instill new collaborative teaching methods, like co-teaching, as they encourage students to become active members of the learning process⁴.

More recently, many schools have incorporated the use of arts, design and humanities to encourage authentic learning. These subjects act as a platform for reflection and discussion that enable students to immerse themselves in real-world problems. This notion has fostered the STEAM learning movement, incorporating 'arts' into the traditional academic discipline of science, technology, engineering and mathematics (STEM) subjects. The intersection of STEAM, humanities and social sciences has been brought together by the Australian Curriculum Symposium to develop and integrate cross-curricular learning opportunities⁵.

Authentic learning experiences occur when an individual can immerse themselves in real-world problems to gain lifelong learning skills. When students discover personal learning, and internalise and literally place it in their own words, their motivation to learn increases as they can connect what they are learning with a future career that interests them⁶. Authentic learning helps bridge the gap between academic knowledge and concrete applications by establishing partnerships with the broader community. Internship programs, apprenticeships and community-based projects are examples of active partnerships with local organisations to enable students to learn essential skills beyond the classroom⁷. A hands-on setting mimicking real-world experience is important in schools as it helps expand awareness and understanding of students' abilities and the purpose of their education beyond the classroom. For students to effectively communicate globally and to operate with advanced technological systems, students will need to be equipped to make knowledge applicable in any setting⁸. Authentic learning experiences can help to provide them with this knowledge.

While most schools are aware of the importance of authentic learning, many are still challenged in generating these opportunities in spaces that still lean on traditional practices⁹. Schools are often confronted by a crowded curriculum, as teachers are expected to cover a wide range of topics at a given time rather than developing deep appreciations of core disciplinary concepts. In such schools, educators may need to collaborate and plan cooperative interdisciplinary projects across all curricula, as interdisciplinary learning can break down barriers that have traditionally existed between different classes and subjects, and offers learners opportunities to make new connections¹⁰.

To deliver the types of authentic learning experiences that match the values, norms, relationship styles and learning preferences of millennial students, schools can continue to connect the curriculum with real-world applications using different learning approaches, such as problem-based learning, project-based learning, challenge-based learning and inquiry-based learning.

How flexible is the curriculum and current educational structure to deliver this? Time will tell. However, making learning authentic, relevant, meaningful and purposeful is important if we want students to achieve deep learning that they can transfer into adulthood. As Benjamin Franklin put it: 'Tell me and I forget, teach me and I remember, involve me and I learn'.

BELONGING, BEING AND BECOMING ACTIVE GLOBAL CITIZENS

The challenges we face in a more interconnected world are global in nature and require coordinated international action to solve. While technology has brought us closer together, a more connected world has also, arguably, placed greater pressure on young people, both educationally and mentally.

According to a 2018 survey of 28,286 young Australians aged 15-19 years, young people identified mental health, alcohol and drugs, and equality and discrimination as the three most important issues in Australia today¹¹. In a changing and diverse world, the importance of developing social and emotional skills is becoming more evident. One approach to assist students to grow these skills is to develop their self-identity: who they believe themselves to be and how they see themselves in society. While self-identity will change as they grow, keeping children grounded in reality and creating a strong and healthy sense of identity is important to help them create meaning and purpose. A student's ability to embrace their diversity and be comfortable in who they are will also help them challenge opinions and assumptions, and to express their own views and ideas. Doing well in school and in life is much more than a high IQ or the ability to learn quickly; it requires the ability to persevere and to be resilient. Research consistently shows that employers are looking for individuals who can work effectively with others to solve challenges, not exam geniuses who crumble under the pressure of the real world¹².

Alongside developing a strong sense of self-identity, students navigating the future world might need to become more ecologically literate, since global change is at a tipping point. Ecological literacy is the understanding of the principles of organisation, common to all living things that ecosystems have evolved to sustain life on Earth¹³. Global problems are more complicated, occur more quickly and require a level of education outside of classrooms. It is important for students to understand the current and future societal concerns, such as climate change, ageing population, global migration, gender discrimination, and inequalities of access. We as a society should consider ways to develop learners with an awareness of history who appreciate the present and prepare for the future. To do so, learning will have to be relevant, active and focused on real-life issues to prepare students for life beyond school.

In Australia, many environmental education programs have incorporated a range of community-based excursions to learn in, from and through the environment. For example, there is much research that suggests that cross-collaboration with the arts is an effective approach to deepening self-identity and to think reflectively on issues of local, national and global importance¹⁴. A recent ISV survey into arts education also showed that many schools have successfully incorporated the arts to generate a platform to instill civic engagement. Community-based excursions provide immediate opportunities for youth involvement in global issues, such as climate change, which not only promote innovative thinking, but act as a platform for real-world application that challenges students to think from a global perspective and be active citizens¹⁵. Being an active citizen can be defined as people who critically engage with and seek to affect the course of social events and ultimately act as agents who shape and change society¹⁶. In a report conducted by Padilla-Walker and Nelson (2017)¹⁷, longitudinal studies have found that children who actively participate in and contribute to the community were more likely to have positive development and behavioural outcomes leading into adulthood. Besides contributing to society, students will be increasingly required to learn to become global connected citizens, such as learning to communicate ideas effectively with diverse audiences, bridging geographic, linguistic and cultural barriers.



Research has found that a student's view of themselves as a learner has a profound effect on their learning trajectory and outcomes, and in turn their academic grades

How will schools and communities develop more opportunities to increase democratic and participatory action among young citizens that help them see their important role as global citizens? This will potentially require changes to the school curriculum. Schools will need a curriculum that deepens students' understanding of global issues to enable them to recognise themselves as active global citizens. Students will need a variety of platforms to construct their own identity and project their voice and opinions on matters which affect them. Most global issues can be localised and learning can start in the school community.

What is not in doubt is that for students to thrive as global citizens, they will need opportunities for real-world application that can encourage them to look within to create meaning and purpose, to build perseverance and resilience; and to think from a global perspective and become active citizens. The arts are one vehicle schools can use to achieve this aim.

CULTIVATING INNOVATIVE LEARNING

Over the years, the skills underpinning effective learning and capabilities have evolved. According to the OECD Skills Outlook 2017, strong cognitive skills are not enough on their own to achieve academic and future success. To succeed in the future and to specialise in the most technologically advanced industries, an individual will need the right mix of skills¹⁸. Skills such as communication, collaboration, problem solving, creativity and innovation were highlighted by The Melbourne Declaration on Educational Goals for Young Australians as keys to becoming successful learners¹⁹. Similarly, the learning skills for the 21st Century have been identified as critical thinking, creativity, communication and collaboration (dubbed the four Cs of learning). Many schools and education systems have been shifting their pedagogy to address this new skillset by designing active learning environments where students are encouraged to ask questions, seek information and apply their knowledge.

While this skillset is critical to the modern classroom, these skills cannot be gained without identifying and exploring the underlying cognitive processes that underpin effective learning, such as sustaining attention, goal setting, planning, prioritising, monitoring, correcting errors, adapting and regulating learning. These fall under the umbrella of entitled executive functions, also known as metacognition²⁰. Metacognition is the act of planning, monitoring and evaluating one's own learning process, rather than simply having knowledge of this. Metacognitive awareness and regulation can be taught by explicitly teaching metacognitive strategies (teaching students how they think and learn), and by moving away from the focus on the content, or the **what**, to the process, or the **how**, of learning²¹. According to Tanner (2012), the point at which students become aware of how and when to apply the metacognitive strategies in their learning is hypothetically the point at which they have matured into lifelong learners²². There is growing evidence that suggests a higher command of executive functions is positively linked to educational, social and economic success²³. The emerging field of educational neuroscience is becoming more important in schools as it is well established that the brain changes in response to environmental demands. Providing students with knowledge of neuroscience and an understanding of how the brain works can both increase lifelong learning in students and encourage educators to incorporate new teaching pedagogies in the classroom²⁴

Research has found that a student's view of themselves as a learner has a profound effect on their learning trajectory and outcomes, and in turn their academic grades. The ability to form an accurate belief in their ability to succeed in specific situations and to accomplish tasks both alone and with others, defined as self-efficacy, is an important skill to have if students are to flourish in the future²⁵.

Alongside developing strong executive functions and cognitive skills, the connected nature of the world suggests that social skills and emotional intelligence will be just as important in the future. There is a large body of accumulated evidence showing that social and emotional skills have strong relationships with life outcomes and they have been referred to as a key component of 21st Century skills²⁶. The ‘super skills’ for the 21st century, namely the four Cs of learning, might be enough to simply prepare students to work in the future, but might not be sufficient to generate leaders for tomorrow. Perhaps a more contemporary framework to enable students to learn and succeed in a global economy is the development of the six Cs of education, in which ‘character’ and ‘citizenship’ are included to tackle what goes beyond the classroom²⁷. Character refers to qualities such as resilience, tenacity and perseverance, and citizenship involves thinking like global citizens, considering global issues and engaging with others to solve complex problems that impact on human and environmental sustainability²⁸. Similarly, according to the *OECD Learning Compass 2030*, competencies that will help students navigate towards future wellbeing and to become agents of change include cognitive and metacognitive skills, social and emotional skills, and practical and physical skills²⁹.

As conventional teaching models evolve and as schools embrace student-centric pedagogies, school leaders are beginning to investigate how they can provide an environment that will most effectively support collaborative, creative and innovative learning. Numerous studies have been conducted to understand the best conditions for learning to complement recent understandings of how the brain learns. The spaces within which students learn play a significant role in equipping students with 21st Century learning skills³⁰. The concept of innovative learning environments has emerged as social, psychological, economic and environmental factors influence the way we perceive the learning context, including the roles of teachers and students³¹. As learning becomes more fluid and student-centered, schools are beginning to pilot flexible schedules that remove the limitation of bells or class schedules. This will allow students to move from one learning activity to another more organically and to experience authentic learning³². At a time when solutions to societal challenges and the nature of work are becoming increasingly cross-disciplinary, school subjects cannot be taught in isolation from each other. Similarly, at a time when new technologies are transforming how courses are delivered and how learning takes place, school curricula may need to move beyond traditional classroom settings.

While a good physical learning environment influences a student’s capacity to learn, the design becomes innovative only if teaching and learning are also innovative. There is evidence that indicates this combination can facilitate the best possible learning outcomes. This suggests an opportunity for schools to consider and revise teaching pedagogies and learning styles to continually enable the opportunity for innovative learning³³. For example, many schools have started implementing design thinking in the classroom to optimise metacognitive competencies. The design thinking approach to learning focuses on developing students’ creative confidence and innovation, as teachers and students engage in hands-on challenges that focus on fostering active problem solving. It typically starts with understanding and observing a problem, then synthesising, ideating, prototyping, testing and implementing. The culture of collaboration, growth and experimentation is more likely to be achieved when teachers and students adopt a design thinking mindset³⁴. Transforming traditional required curriculum into contemporary pedagogy where learning is engaging, meaningful and modern will be important in today’s and tomorrow’s dynamic environments.

What would innovative learning look like in schools? The best approaches will be relevant to the needs of each school’s students, rather than simply copying trends or successful outcomes in this field. This includes a deep understanding of learners’ needs and manipulating learning environments to cater for different needs and allowing students the flexibility to choose the best environment to learn.

Technology penetrates and permeates every aspect of society and is an important instrument of change. The acceleration of technological change differentiates today's world from previous periods of technological advancements. Technological change is no longer confined loosely to generational change; rather, new emerging technologies that blur traditional boundaries between the digital, physical and biological worlds are occurring every few years.

Such emerging technologies have allowed us to connect across the globe, regardless of location, and for literally no cost, making collaboration and communication possible. The world has become smaller, faster and more connected. Technology has both excited the human imagination and prompted fears about its effects. In education, online education, to take one example, is already gearing up to use virtual humans to provide efficient, entertaining educational experiences³⁵.

While multiple examples exist of how technology brings positive changes to education, it is still far from common practice in schools. Education technology investment represents a mere 0.3 per cent of the estimated global education sector, due in part to challenges such as lack of sufficient infrastructure and access to the digital economy, the high level of investment required, the complexity of implementation and the risks arising from technology implementation³⁶.

Despite these challenges, the emergence of sophisticated technologies associated with what Klaus Schwab has coined 'the fourth industrial revolution' will continue to significantly affect education³⁷. Schools and school leaders should explore the possibilities and challenges technology brings to develop learners who are fit for purpose for the world they will inhabit.

ENCOURAGING DIGITAL RESILIENCE AND COMPETENCY

One of the major changes for schools in relation to technology is the diversity of information that students have access to, which influences their thinking. While computing devices allow students to stay connected, they can also have mental health consequences, as machine communication is less protected than human communication³⁸. To compensate for the effects of increased digital exposure in young people, schools, parents and society are considering strategies to increase their digital resilience.

With the rise of technology and online learning environments, the access of socio-emotional cues is reduced. A lack of social awareness can have a detrimental effect on collaboration and learning and may lead to inappropriate or dangerous behavior such as cyberbullying.

Schools are making increasing efforts to reduce cyberbullying. Yet a 2018 research study showed that fewer than 10 per cent of Australian secondary school staff reported feeling 'very skilled' to deal with cyberbullying, while 50 per cent felt 'poorly or not at all skilled' to do so³⁹. Teachers will need to be equipped with cybersafety knowledge, strategies and interventions to reduce cyberbullying. They will need to be taught digital resilience by first developing their own digital literacy skills, keeping up to date on new developments in cyber risks and in preventing and detecting fraud⁴⁰. More importantly, schools will need to remain vigilant and identify the root cause of cyberbullying by understanding how childhood identity is constructed and how children create meaning in their social worlds. Students are enabled with powerful tools today that allow them to challenge expectations and develop different identities. As students continue to communicate in both online and physical spaces, the use of blocking technology might ultimately prove futile.⁴¹

Australian students have high levels of access to digital technologies, in and out of school. An increasing number have access to smart phones, tablets, computers or equivalent devices. Sometimes referred to as 'digital natives', they have grown up in a world of digital technology. However, despite their fluency with social media and exposure to technology, many students are unaware of basic conventions for identifying verified digital information and are likely to believe everything they see, read and hear.⁴²

To make the most of the wealth of knowledge and information at their fingertips, students must acquire a deep understanding of the digital environment. They will need to become proficient users of digital technologies and develop the intuition to adapt these skills to new contexts and the ability to co-create content with others. Analytical skills, such as conceptualising, organising and synthesising data, will become increasingly important as students learn to build their confidence and capacity to contribute in an evolving digital landscape⁴³.



The rapid acceleration of technological advancement has seen entire industries fall victim to digital disruption. Will schools be exempt from this change?

These necessary competencies of the digital age are known as computational thinking (CT). The term can be traced to algorithmic thinking where learners use algorithms to convert inputs to outputs⁴⁴. CT is synonymous with complex thinking and is defined as the ability to develop and employ thought process in understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. CT is not the same as coding or programming, but rather a ‘thought processes’ for formulating a problem and expressing a solution, which is what humans do⁴⁵.

CT will be applicable in any industries in the future, not just computer science, and graduate students will have to learn computational thinking regardless of what field they studied.⁴⁶ According to Zinser (2012), having students learn the newest technology is not as valuable as ensuring they are technologically literate. Technological literacy is defined by the International Technology Education Association as the skill to ‘understand what technology is, how it is created, how it shapes society, and in turn is shaped by society’⁴⁷. Despite the high level of interest in CT and coding or programming, there is a range of issues and challenges to be addressed for effective integration in the curriculum.

As data literacy spans subjects and year levels, schools face the challenge to embed it in the curriculum and to ensure access to internet and related technologies⁴⁸. Teachers are not trained or prepared to teach computational thinking and, as CT spans subjects, schools are uncertain whether to address it within a specified subject or as part of STEM or as a cross-curricular topic⁴⁹. Further, many schools are uncertain on what concepts to teach and at which year level, as it is still uncertain what degree of reasoning capability is needed to learn a given concept. As such, CT is regarded to be in its infancy⁵⁰.

What is not in dispute is that students will need to have the knowledge, skills and understanding of computer science, digital literacy and CT to live in the digital future. How quickly will policy makers react to the challenge of integrating CT into the curriculum? What is also unclear is how will schools adapt to these changes and which technological tools should they invest in and incorporate in the curriculum?

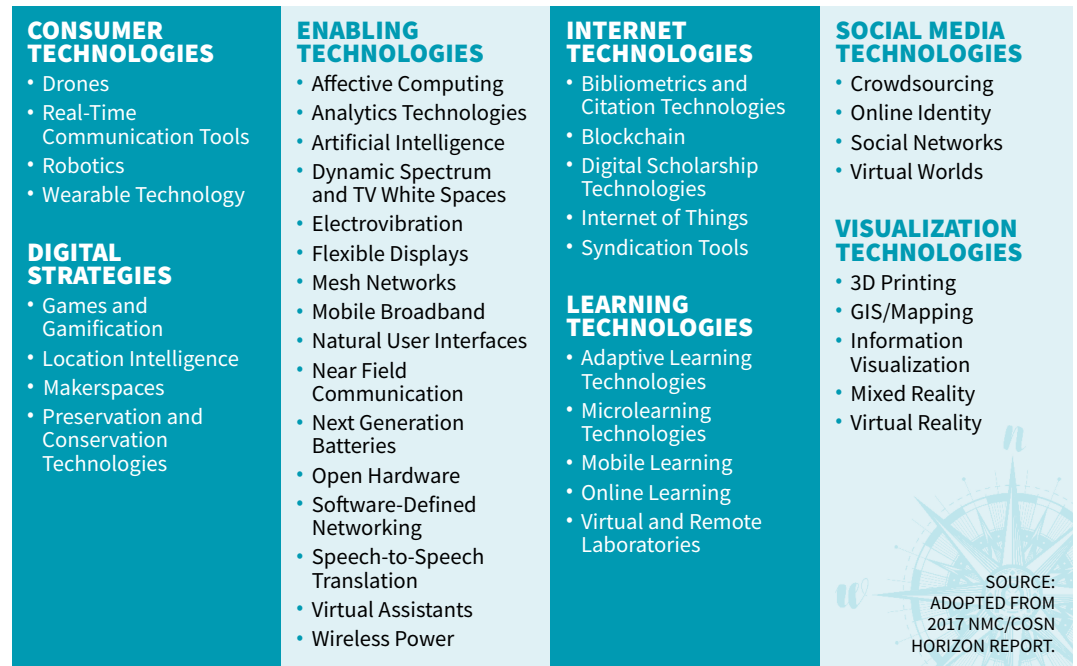
INCORPORATING THE ‘RIGHT’ TECHNOLOGY IN SCHOOL

The use of technological applications is not new. Overhead projectors, calculators and photocopiers, for example, have all found their place in the classroom over past decades. While these examples have been integrated in the classroom, the latest digital applications aim to help students obtain feedback and generate new technology-reinforced personalisation in the classroom⁵¹. Such technologies have a completely different focus than before – which is to take away or augment the traditional role of the educator.

The revolutionary power of the growing array of technological learning programs and student support systems will potentially have significant implications for schools and education systems.

The rapid acceleration of technological advancement has seen entire industries fall victim to digital disruption. Will schools be exempt from this change? Will technology fundamentally alter the classroom over the next five to ten years?

What is evident is that artificial intelligence, virtual reality and machine learning will impact on schools in some way. The following image from the 2017 NMC/CoSN Horizon Report shows seven categories of technology based on their primary origins and use, and examples of technological tools within each category. The categories are organised into pathways of development and intends to provide a way for educators to think about innovation relevant to learning and creative inquiry⁵².



Many of these learning technologies were not available a decade ago. Considering current rates of technological advancement, it is feasible that this list will be completely reimaged in the next five to ten years.

A key question for school leaders is which of the above technological tools will improve teaching and learning?

In the new era of automation and artificial intelligence (AI) adoption, schools are working towards equipping students with the skills they need for an evolving world of work. As most students are engaging naturally with technology, it is important for their learning to be aligned with technology so that they can express themselves creatively. Some technology tools have been gaining serious momentum in schools. One such tool is Makerspaces, which champion the process of experimentation and iteration as students learn to continuously improve prototypes as they learn what works and what does not⁵³. Similarly, schools are harnessing the study of robotics to promote critical and computational thinking in STEM subjects and beyond. Teachers are also using robotics in the classroom in a service capacity and facilitated learning activities⁵⁴.

More schools are beginning to include coding in the classroom. Companies such as 'Code like a girl' and 'Girl geek academy' in Australia have been developed to address persistent gender disparities in coding⁵⁵. Some schools have also started equating coding and storytelling as part of the learning experience as they give context and situate the design challenge within a story.⁵⁶ This shows how schools can blend the power of technology and social interaction through one of the important differences that make us human: our storytelling abilities.

Another technological tool gaining traction relates to simulation and virtual learning. Virtual reality (VR) is becoming more mainstream, especially in video games, making game environments and actions more lifelike. VR refers to computer-generated environments that simulate the physical presence to produce realistic sensory experiences⁵⁷. VR tools, such as Samsung Gear VR and Sony PlayStation VR, have enabled users to authentically 'feel' objects through gesture-based and haptic devices. This is a potentially important way to link students with global problems in a way that provides the type of authentic learning experience referred to earlier.

VR is increasingly used in learning for collaboration and personal encounters, to make learning immersive, which can lead to higher student engagement and retention. In addition, collaborative learning when paired well with technology can result in improved social and emotional skill development⁵⁸. VR can overcome shortcomings in STEM education, including a reliance on theory and lack of concrete experiences. Research has shown that the opportunity to explore, investigate, interact with and manipulate empowers a ‘what if’ thinking, enabling students to transfer what they learned to the real world⁵⁹. Such technology can help students to tackle global problems in collaboration with other schools, systems and countries. Despite the promise of VR in relation to developing authentic learning and the widespread interest and investigation of how VR can benefit education, only a minority of teachers are using it in the classroom or teaching students to create VR content⁶⁰. This is a potential area of growth.

AI is defined as computer systems designed to interact with the world through capabilities that closely resemble those of humans. AI has the potential to enhance online learning, adaptive learning software, and simulations in ways that more intuitively respond to and engage with students. It can be used to boost students’ personalised learning and authentic learning experience by providing continuous and instant feedback⁶¹. At-risk students have benefited from data mining tools as they can predict learner outcomes, trigger interventions and prescribe new strategies to improve student success. Data from AI tools that identify students’ learning patterns can help teachers improve their pedagogies. For example, teachers can gain insights into individual learner’s journeys to find where they struggle and provide assistance in that specific learning context⁶². Personalised learning, including customisation and integrated experiences, are expected by millennials as they can get what they want (connection, support, knowledge and skills) more readily from distributed sources. AI tools can help students explore and determine how best they learn and adapt tests to their competency level, which help increase their self-awareness and ability to progress⁶³. The Vocabulary Learning App is an AI example in practice, where learners build language skills through activities featuring *Sesame Street* characters. The app is built on the IBM Watson’s AI technologies that incorporate natural language processing and pattern recognition to customise each student’s lesson pace. Teachers can further personalise and monitor learner’s progress through an instructor dashboard⁶⁴.

Adaptive software, such as online content, learning games and online cognitive tutoring tools, have allowed us to rethink how content is delivered within learning models, building from a deeper understanding of how different learners can engage with content and support systems⁶⁵.

Although learning is most likely to occur when students are given activities at an appropriate level of challenge, understanding individual levels of readiness and establishing where students are in their learning is arguably not yet a routine practice in all schools. New technologies have the potential to diagnose and personalise learning⁶⁶.

The incorporation of technology has opened new windows for thoughts, ideas and innovation. The question, however, is how much of the teaching process should be augmented or automated through technology? One helpful way to view this question is that technology should not be a substitute for traditional teaching, but rather a complement for an enriching experience⁶⁷. At the same time, technology is omnipresent. Therefore, schools should explore better pedagogies and education models in order to leverage digital tools and platforms as enablers and accelerators, since technology alone cannot cultivate education transformation. A good place for school leaders to start is with a thorough exploration of the education problems in their own school and design clear specifications of those problems. Without such an audit, it is hard to articulate, for example, what role AI technologies can best play in a school, what types of AI methods, techniques or technology should be used, and what potential value they can provide to individual students. Schools should not be seduced by technology when solving educational problems. It is not simply employing new technological tools but, more importantly, investigating which tools can best solve fundamental problems and deliver the strongest return on investment.





How schools deal with privacy and ethical concerns around data is likely to become increasingly important.

If schools and education systems fail to engage with the possibilities of technology in the classroom and explore ways to enrich learning, they and their students run the risk of losing out to other schools and education models that do see the benefits. Society is changing very rapidly and the traditional school model might not mirror what current or future parents want for their children. Therefore, schools should consider incorporating the right technology that can enable students to leverage their learning and are equipped with the skills to cope in a digital world. As elaborated in Bughin et al. (2019), ‘intrinsicly, technology is neither good nor bad, it is the use to which it is put that makes the difference’⁶⁸.

BIG DATA, ETHICS AND GOVERNANCE

The rate of technological adoption in schools heightens challenges in data governance and integration. Some schools are already grappling with these challenges but questions remain.

The notion of big data is not new. Given that most interactions are made over the internet and that technologies adopted are largely digital, large volumes of data are now available at high velocity and with high variability. Between 2015 to 2017, consumers and enterprises created more data than the sum of all data created prior to that time. Data science platforms can already collect and computationally analyse exabytes of data and it is predicted that by the year 2020, the digital universe will expand tenfold from 4.4. to 44 zettabytes⁶⁹. The internet of things (IoT) is about to become vastly more functional, which will affect jobs and the employment market. Data are the currency of the digital economy, driving the information age and shaping a knowledge-based society⁷⁰. With the increasing availability of data, analytic technologies have been used to turn it into understandable, meaningful and actionable information.

Examples of analytics technologies include database management systems, data warehouses (structured data), business intelligence reporting tools, visualisation software, and modeling and predictive analytics tools. These technologies are used to collect, connect, combine and interpret meaning, which are needed to move from data-rich and information-poor scenarios to data-driven, AI and machine learning, information-rich scenarios⁷¹. They are not necessarily deployed in the classroom but rather embedded into the enterprise information technology architecture administered at the school, such as student information systems and learning management systems⁷². Analytics technologies have been used to track student activities, behavior, performance and interests to identify individual learners’ experiences. Real-time learner analytics dashboards with instructor and student views, as well as administrative and parent view options, enable a holistic approach to teaching and learning⁷³.

Technologies to handle data capture, storage and integration are already common in many schools. Other analytics technologies are less common, but available. For example, students can easily access and share learning materials with each other by using cloud-based collaboration tools such as Google Apps for Education⁷⁴. This is potentially attractive to school leaders, as cloud computing enables geographically diverse groups to collaborate and share files, data and information, which in turn drives new data-driven technology and access to agile systems and environments, reduced cost, enhanced performance monitoring, increased productivity and collaboration⁷⁵. These types of analytics technologies have been heavily adopted by industries such as the retail and consumer sectors. Use in schools remains in its infancy, possibly because of the challenges associated with managing big data efficiently.

With the growing volume of data generated and captured, there is substantial amount of confidential information stored on servers all around the world. How schools deal with privacy and ethical concerns around data is likely to become increasingly important.

Concerns about privacy and security, such as database leakage or theft, already exist. As schools integrate and adopt technologies, they face a host of problems and questions, from individual privacy to proprietary intellectual property concerns⁷⁶.

A good process and system of collecting, storing, using and disseminating data is essential to ensure sensitive information is not compromised. Schools, like other large organisations, will need to continually monitor and adapt policies to address privacy and security, as technological change is inevitable. According to Kaplan et al. (2019), current cybersecurity operating models do not work at



‘cloud speed’. It takes companies weeks to conduct vulnerability scans to promote their application to production although it only takes minutes to spin something up⁷⁷. In response to aggressive digitalisation, schools require solid data governance systems to manage fraud prevention and security, enable transparency and visibility of data use, and use data to create valuable insights. As schools become more adept at working with and interpreting big data – while identifying risks – they can make more informed decisions that reflect learner needs. School leaders may need to stay cognizant of existing and future regulations, laws and policies to keep pace with the changing digital landscape and changing societal views on ethics.

Managing data and technology is not the only challenge that schools which embrace technology will face. Of equal importance will be how schools cope with the obvious ethical dilemmas technologies like AI will create.

Concerns have been raised around the use of learning companions. There are fears that a companion that ‘followed’ you would instead perpetually record failures to the detriment of future progress⁷⁸. Further, young children can perceive a social robot as a trusted friend, but current technology lacks sufficient emotional intelligence to provide required support⁷⁹. While this might sound far-fetched, smart algorithms driven by machine learning and AI already make numerous decisions for us every day – from the route we take to work to what we stream on our television at night. These moral and ethical concerns will increase as AI permeates more areas of society such as the classroom.

According to IBM research, within the next five years the number of biased AI systems and algorithms will increase as data used to train AI can contain implicit racial, gender or ideological biases⁸⁰. Schools that adopt new technologies with AI or machine learning capabilities will need to be aware of these ethical and moral predicaments and develop solutions to control bias. Likewise, as the amount of data a school collects grows exponentially, the possible impact of cyber risks on students, teachers and school leaders means schools will need to prepare and embrace uncertainty by having protocols and systems to prevent and mitigate risks. Schools will be required to answer ethical questions, such as who owns the data, who can use it, for what purposes, and who is ultimately accountable.

Such concerns are perhaps on the periphery for some schools but as the use of technology increases these issues will come into sharp focus. School leaders should consider planning for these challenges before they arise.

The considerable challenge of integrating technology in the classroom is multi-faceted, which makes it tempting to ignore. In a knowledge-based society, the difference between those who take advantage of knowledge access and those who do not, will be significant. Employability is directly related to education in a knowledge economy and higher skilled jobs in the future will require the incorporation of technology⁸¹.

These trends and projections highlight the need for schools to be prepared to cope and excel with the acceleration of technology. To stay relevant and innovative, schools should encourage data literacy among students and teachers, evaluate the right technology to incorporate in the school’s context, and manage ethical concerns arising from data and technology integration.

Integrating advanced technologies into the classroom and evolving learning experiences to match the realities of the global world has the potential to help equip students to tackle global challenges once they complete their formal education and move into the workforce.

But what will work look like in the future?

With automation and AI tipped to redefine labour markets and drastically change the way we work, what careers are we educating our youth for? What skills will be important in the future? And what do the answers to these questions mean for the traditional role of the teacher and the skills they require?



The skills required for economic and social success are already changing. For example, as agriculture's share of the Australian economy declined in the 20th Century, many farming jobs disappeared, and new jobs were created, such as in manufacturing and service sector industries⁸². This is not new. Jobs and employment models are continually changing with advances in technology that raise economic productivity, even if adoption of this technology causes large-scale structural transformation and leads to worker dislocation, such as mechanisation during the Industrial Revolution⁸³.

Today, advances in AI and automation add great uncertainty and fear in the workforce about an upcoming AI Revolution. A report from Bain & Company (2019) summarised the potential impact of AI on society as: 'Digital technologies are doing for human brainpower what the steam engine and related technologies did for human muscle power during the Industrial Revolution'⁸⁴. This 'fourth industrial revolution' that will merge the digital, physical and biological worlds is tipped to have a profound effect on society and the nature of work.

EDUCATING THE WORKFORCE OF TOMORROW

A key driver shaping the workforce of the future is the potential for technology to increase productivity and contribute to a reduction in the need for labour and the disappearance of many low to middle-income jobs. Many low skilled jobs are being offshored or automated and the share of jobs requiring simple repetitive tasks will shrink in years to come⁸⁵. Big data and automation, such as robotics and AI, increased competition from globalisation, and decentralisation, may lead to fewer traditional full-time jobs and more on-demand, project-based work. There has been a significant rise in the number of entrepreneurs creating their own jobs and running their own businesses based on gaps they find in the market⁸⁶. As digital technology provides options for new market entrants to compete with longstanding incumbents at a global level, the era of entrepreneurship will increase rapidly⁸⁷.

The shift in the institutional landscape associated with digital technologies has demonstrated an ability to scale-up and disrupt markets more quickly than ever before. For example, the booming peer-to-peer (P2P) market such as Airbnb, Uber, AirTasker and Etsy creates the opportunity for individuals to promote themselves across job markets that ordinarily would not be possible. Other platform economy companies such as Google, eBay, Instagram and Amazon have all achieved exponential rates of market capitalisation compared to historical patterns of company growth⁸⁸.

DETERMINING SKILLS AND ACHIEVEMENT IN THE FUTURE

The changes to the labour market driven by advanced technologies and the growth of entrepreneurship will require considerable investment in retraining and developing skills that are transferrable across industries. As a precursor to this change, employers are now seeking better information about students' abilities to work in teams, use technology, communicate, solve problems or learn on the job. Prominent business leaders are questioning the need for four-year degrees altogether, as top companies such as Apple, Google and Netflix are hiring people without a four-year university degree but who have skills required to get the job done.

In the future, a university degree alone might not be a hallmark of skills and achievement. Current trends suggest that innovative thinking and self-development are more likely to set a young employee apart⁸⁹. For example, a longitudinal research report showed that academic skills are strongly correlated to the earning power for those born prior to 1960s. However, for those born in 1970s and after, non-cognitive skills are better predictors of earnings⁹⁰. Employers will increasingly seek job applicants who can think for themselves, are intrinsically motivated and team-oriented, and exhibit resilience and determination. As a result, in the coming era, competencies will matter more than formal credentials.

How will this shift toward competencies rather than academic rankings impact on the assessment of school leavers?



The challenge for school leaders is to think critically about the links they provide their students between the work of school and the world of work.

If tertiary education providers alter their approach to selecting students to align to this shift, it will potentially pose serious questions for education systems and schools in terms of the skills they teach and assess.

According to Bughin et al. (2019), skills that are currently not part of the curriculum will increase in demand – such as empathy, adaptability, entrepreneurship, initiative taking and the ability to negotiate⁹¹. Recent research by Deloitte Insights further validated the McKinsey findings. This study on the future of work identified that being ‘human’ is the future of work, despite big shifts in technology and global uncertainties. In other words, uniquely human skills like creativity, care for others and collaboration are what the future of work and society will be built upon⁹². While technology has replaced many jobs that can be automated, it has created far more jobs that focus on higher value-added tasks that require higher-order thinking skills and core competencies.

CAREER CONNECTED LEARNING

How can schools support students in the development of these skills necessary for work requirements of the future?

A strong career education program is one area in which schools can equip students with the skills they need. Career education is defined as the ‘development of knowledge, skills and attributes through a planned program of learning experiences in education and training settings that will assist students to make informed decisions about their study and/or work options and enable effective participation in working life’⁹³. Exposure to different career options will enable students to explore their interests and passions at a young age and to be aware of a typical career path. A well-regarded approach to career education generally involves strategic planning, professional learning, career education expertise, school leadership and community engagement⁹⁴. For example, school leadership could strengthen collaboration between schools, employers and local communities to improve student engagement with work environments, and support successful transition to further education, training and work. According to a recent report from Bain & Company, apprenticeship programs that combine school and on-the-job training could better prepare students for the workforce of the future⁹⁵.

To prepare students for life and work, schools may need to create new pathways that combine classroom learning with meaningful, on-the-job work experiences. This suggests that schools will need to move beyond traditional educational constructs of study-then-work, to an approach that adopts a study-and-work model that privileges career-connected learning⁹⁶. Such an approach would see schools using innovative learning tools and working in close collaboration with business, industrial organisations and governments to ensure the educational program and assessments are developed in accordance with future workplace needs⁹⁷. This would allow students to explore various pathways and develop technical skills in a range of disciplines or fields, and soft skills and competencies such as empathy, adaptability and collaboration.

The challenge for school leaders is to think critically about the links they provide their students between the work of school and the world of work. Innovative schools will look to provide learning approaches that favour real-world experiences that enable students to cope with the changing nature of study, work and life.

The changing nature of work and developments in digital technology will place pressure on schools to play dual roles in the future. Not only will they need to continue to provide students with foundation level skills in reading, writing and arithmetic, increasingly schools will be called upon to ensure that students leave school with the tools and competencies to constantly reskill and upskill to keep pace with global competition. What will this mean for current school leaders, teachers and the broader education workforce? To what extent will school structures, teacher training and approaches to technology need to change to support these dual purposes?



As the Australian economy evolves, we are seeing shifting patterns of employment across different industries. The creation of a knowledge economy, changing demographics, technology advances, platform economics, emerging economies and globalisation have made education one of the top growing industries in Australia⁹⁸. How do we hold onto this position and how do we keep schools strong in the future?

ENABLING EDUCATORS OF TOMORROW

In schools, large numbers of baby boomer principals and middle executives are reaching retirement and in coming decades we will see the younger generation on the frontline.

The changing nature of work and generational differences in schools creates the phenomenon of 'generational collide'. A study conducted in schools across Sydney found that all three generational groups agreed that this is occurring in their schools⁹⁹. The term is underpinned by the intersection of five major 21st Century social or cultural movements that are simultaneously affecting schools: the changing nature of work; generational differences; generational differences in the workplace; general differences in the school environment; and teacher career trajectories¹⁰⁰. As a significant number of baby boomers will retire soon, strong mentoring, coaching and shadowing from this experienced leadership cohort is important to ensure effective knowledge transfer. Schools will also need support from policy makers and actions that include peer exchanges and community building to enable the sharing of best practices among teachers in the face of this challenge.

USING EVIDENCE-BASED DATA TO ENABLE AN ADAPTIVE SYSTEM

The changing needs and expectations of schooling suggests that teachers will have to continue testing new approaches to facilitate targeted teaching. As teachers consistently change their practice in response to changes in schools and the external environment, it is vital to have effective processes to uncover what works best, for whom, and in what circumstances. This process of changing practice in response to various pressures enables an adaptive education system. Highly effective teaching practices do not automatically become more common over time; they happen through intentional efforts to align the processes of adaptation using evidence of student learning¹⁰¹.

As the future workplace becomes more ambiguous, teachers will also need to continue to use data effectively to assess students against future competencies. According to Freeman et al. (2017), we will need to continue assessing students based on what they can do, rather than what they can remember, and to assess them against the skills of the future if we want to stay relevant. Measuring and accessing students' learning goes beyond standardised scores and surface-level knowledge¹⁰². Teachers may also be required to increase measurement of learning using data-driven insights to understand students' strengths and weaknesses to track individual progress.

A potential shift toward assessment against competencies and using data and technology to assess learning suggests that teachers who are evaluators, change agents and seekers of feedback will perhaps have increased influence on student achievement. Recent research into innovative learning environments and teacher change suggests that such teachers are more likely to believe they have control and influence in which classroom learning happens and more likely to evaluate the effect of their own teaching on students' learning and achievement¹⁰³.

In the future, schools that embrace a culture of evaluation and sharing results may break down silos and fuel creativity and innovation. Research by Professor John Hattie (as cited in Barnes et al., 2018) shows that continued evaluation of learning and teaching practices using research evidence are essential to informing teaching practices that result in student improvements. Hattie further emphasised that this collective teacher efficacy will build collaborative expertise to consistently improve and push for innovative practices¹⁰⁴.

USING TECHNOLOGY TO ENHANCE TEACHING

In a changing education system, teachers are expected to process and evaluate new knowledge. Yet as the nature of learning is changing, teachers may need to employ new strategies in the classroom to teach more effectively. As information is now readily available through the internet of things to the majority of students, research suggests that teachers in the future should not only be subject matter experts but teaching-method experts, where they provide less instructions and more mentoring in the life-long learning process¹⁰⁵. As previously mentioned in this report, despite the obvious challenges faced in integrating technology in the classroom, increasing the role of technology also provides teachers with an opportunity to refocus teaching efforts around instruction and mentoring.

While learning with technology has become essential in schools, many teachers may still need to shift their thinking into integrating technologies into their teaching to help students to become more critically aware of technology as a tool, rather than a learning outcome¹⁰⁶. Using technology to teach effectively goes beyond understanding what functions are under the menu items and what buttons to click. Teachers will be the orchestrators of this significant change around understanding when and how to use technological programs and tools to enhance learning¹⁰⁷. For example, the substitution, augmentation, modification and redefinition (SAMR) model can help enable teachers to integrate technology efficiently. SAMR, developed by Dr Ruben Puentedura, provides a technique for moving through degrees of technology adoption from enhancement (substitution and augmentation stages) to transformation (modification and redefinition stages), enabling teachers to integrate technology in meaningful ways and move away from simply using ‘tech for tech’s sake’¹⁰⁸.

To achieve this change, greater symbiosis between teachers and technology-enhanced learning is crucial. Studies have shown that investing heavily in classroom technology on its own does not always improve student performance. Optimum results are often achieved when technology is placed in the hands of expert teachers who use it to facilitate experimentation with pedagogical methodologies¹⁰⁹. As not all students have the same digital, social and emotional competency, teachers’ emotional competence becomes extremely important in designing individualised lessons and facilitating students.

Research on whether technological advancements will replace human teachers and our traditional systems of education has reached a consensus that the human element will remain essential for years to come¹¹⁰. As Balacheff (2016) observes: ‘teaching will no longer be seen as the mission of one single agent, but as the results of the interactions between a variety of agents. Teaching will become an emergent property of a complex system equipped with competences to identify learning needs and to find the most adequate resources, be they human or artificial, virtual or material, in support of learning’¹¹¹.

THE OPPORTUNITY TO RESKILL AND UPSKILL TEACHERS

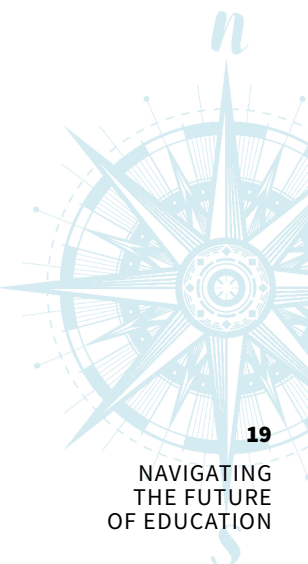
How well prepared are teachers to orchestrate the change in data and technology in schools?

The development of technology may be overwhelming to educators, many of whom were neither taught in their initial education, nor learned subsequently, to teach with technology-assisted support. It is therefore important that teachers and school staff are provided with training opportunities that focus on computational thinking pedagogy and technology. According to a study by Deloitte Insights (2019), over the next decade, education in Australia will face significant shortages so leaders should consider mitigating the effect by upskilling current employees¹¹². In education, the top three skills that have the highest demand corresponding to existing shortages are human skills such as resolving conflicts, organisation and management, and digital literacy. The study emphasised the need to upskill current employees and provide further mentoring and apprenticeship, such as establishing micro-credentialing to unlock the value of emerging job skills¹¹³.

As education changes to accommodate society’s future needs, teachers will also need opportunities to adapt and grow. School leaders should be vigilant in their attempts to empower their staff and invest in the right professional development based on current talent gaps and prioritised areas of growth. To navigate a shift towards more personalised learning, teachers may need to be prepared to embed the right technology to enhance learning and be data collectors, as well as collaborators, curriculum experts, problem-solvers and researchers. As great teachers promote the best out of a classroom and play a strong influence in students’ lives, schools should invest in continued and contextual reskilling.



In education, the top three skills that have the highest demand corresponding to existing shortages are human skills such as resolving conflicts, organisation and management, and digital literacy.



According to Barnes et al. (2018), the four major approaches to achieve success in teaching and learning are:¹¹⁴

- reflective practice (thinking deeply about teaching and how students learn)
- giving students more voice (encouraging them to be active participants and to express their ideas and opinions in their learning where appropriate and feasible)
- new pedagogies (considering and allowing new ways to approach learning that can often provide unexpected results)
- professional learning (having targeted and meaningful professional learning for a successful classroom).

These approaches in relation to understanding learning and learners, encouraging learning through evidence-based teaching and reskilling through targeted professional learning, will help promote educator growth and development and overall school improvement. Changing teaching practice is hard. Teachers need time, training and tools to ensure classroom teaching is relevant and innovative. How can school leaders and teachers juggle and prioritise efforts to produce an adaptive school culture and systemic support for teachers?

CULTIVATING AN INCLUSIVE LEADERSHIP FOR TRANSFORMATIONAL CHANGE

Given the complexities of schools, current changes in the education landscape and the uncertain future, leaders are faced with challenges in taking measures that can impact on the discovery, adoption and implementation of pedagogical strategies. The role of school leaders becomes more complex as they are thought to lead a team of teacher facilitators, instead of leading a team of teachers who have been deliverers of knowledge¹¹⁵.

A report by Bain & Company showed that principals manage many more people than leaders in other fields and they tend to take up the bulk of the management load¹¹⁶. As principals often have multiple responsibilities, empowering teachers to be part of transformational change through distributed leadership will encourage a common language for shared practice and collegiality. Delegated responsibility with sufficient support and opportunities for feedback can enable ownership and advocacy in new strategic initiatives. The theory behind the distributed leadership model lies with the understanding that rather than training principals to be transformational leaders, training all instructors to engage in distributive leadership strategies will enable quicker and more successful innovation in schools¹¹⁷. Empowering staff members from all levels of leadership and across all teams is essential for the successful development and deployment of programs, and critical to ensure the school works collaboratively and focuses its efforts towards the same mission. This theory aligns with the authoritative style of leadership, one who practices distributive leadership rather than mere delegation. Besides having a bias towards innovation and action, authoritative leaders encourage, entrust and support staff by providing timely and appropriate feedback¹¹⁸. This model of distributive leadership may enable leadership sustainability and leadership succession when a principal departs a school.

There is a growing need for collegial learning and collaborative discussion to integrate technological systems in schools' curriculum and pedagogy. Successful technological implementation and improved student outcomes appear to be linked to school leadership. According to Lindqvist and Patterson (2019), the four categories important to school leaders developing a better understanding of digitalisation and digital competencies are: setting the direction; developing people; developing the organisation; and developing teaching and training¹¹⁹. Internally, schools will need to start with a thorough exploration of their educational challenges that involves teachers in developing clear specifications of the issues. This is an essential step to developing well-designed technologically-based solutions.

Externally, school leaders will need to continue to engage strongly with parents, communities and political leaders to recognise the possibilities that technology can bring to drive forward educational transformation; and collaborate with academic, commercial enterprises, school leaders and other education stakeholders to learn from and develop strategies to scale up technological systems in school¹²⁰. While a collaborative work culture is important to focus efforts towards the same mission, what should the vision and mission be for schools to cope with the challenges in the future?

Amid change and uncertainty, schools will need to continue to explore the future education landscape, to redesign and re-evaluate strategies against possible scenarios.

While there is no shortage of challenges in school education, some are largely outside the reach of schools and are deeply rooted in educational processes and structures that are difficult to change¹²¹. However, as change is inevitable, there is a need for strategic foresight and planning to embrace challenges and achieve better results. School leaders will be compelled to explore the future education landscape by considering global trends, as well as emerging technologies and potential disruptors¹²².

Strategic foresight is an emerging field of research aimed at exploring and describing plausible future events. Scenario planning is one of the most widely applied, well-recognised and standardised tools used in strategic foresight to inform decision making and cope with the future. It typically identifies multiple plausible evidence-based narratives of the future and represents an abstracted generalisation of a more complex reality. Strategic foresight is often described as consisting of both arts and science because it combines robust analysis of data, facts and theories, with engaging narratives of the future¹²³. Many studies into the 'future school' attempt to project some scenarios for the future to recognise potential changes and adapt to the evolving aspects of the environment¹²⁴. However, school leaders wishing to apply strategic foresight to their own context will need to understand their current state to ensure a stable and sustainable program is in place to overcome internal factors such as staff turnover and external factors such as funding and policy change¹²⁵. This is where scenario planning may be useful for school leaders. By having a solid strategic plan that is relevant to the external and internal environment, school leaders will avoid being panicked into change for change's sake.

Nevertheless, the overwhelming body of research into the future of education suggests that schools cannot continue in a 'business as usual' condition due to the shifting global and education environments. Transformational efforts are no longer conducted only when organisations have systemic problems. In fact, change initiatives that are ongoing, purposeful, holistic and measured are imperative in a volatile world. Schools may need to be willing to consider fundamental changes to their education model and offering to stay proactive and grow in the future education landscape. The biggest question for any transformational change initiative is how can we gain traction and continue its momentum in a school?

Most schools are aware of the key challenges facing education and discern what needs to be done; the problem is understanding how they can implement changes successfully.

Old, crude methods of throwing things at the wall and seeing what sticks will no longer serve us well¹²⁶. It is important for schools to understand current complications within the school, education system, policies and community, to overcome challenges that arise along the way. School leaders should consider engaging all stakeholders and creating an inclusive strategic plan among senior leaders, teachers, school staff, students, parents, policy makers, academic experts, and communities to move further and faster in transforming their schools.

Most often, the key to successful transformations lies in shifting individual and institutional mindsets at the same time, as a shared vision will help shape a shared future. Transformation is a mammoth effort and it requires everyone to be connected to be co-agents of change.



In a world where entire industries are undergoing rapid transformation driven by digital disruption, it is important that schools and the education workforce do not stand still but continue to evolve and adapt.

Education and learning are preparation for life, not just work. Economic, political, social and technological change are inevitable, and educators are challenged to equip students with the right mix of skills and attitudes to compete both locally and globally. While there is no shortage of changes and challenges confronting schools, they also provide many opportunities for schools to turn challenges to opportunities.

Ensuring the health and wellbeing of students in this period of change is critical. In a volatile world, students will need grit and perseverance to build a higher tolerance for failure. Keeping children grounded and creating a strong and healthy sense of identity is important to help create meaning and purpose in a world where they will need to think from a global perspective to become active citizens.

The spaces within which students learn will also play a significant role in complementing their learning. As it is no longer possible that a robust education will be sufficient for a successful working life, students will need to acquire metacognitive skills, essentially to learn how to learn. Learning does not stop in school and therefore we need to integrate learning into the flow of life. Making learning authentic, relevant, active, meaningful and purposeful will more likely allow learning to be transferred into other areas of studies and in life. Competencies that will help students navigate towards future wellbeing and to become agents of change include a combination of cognitive and metacognitive skills, social and emotional skills, and practical and physical skills.

Rapid technological advances have impacted on the knowledge and skills required for teaching and learning. Schools must continue to explore the possibilities technology offers to support the development of global learners. The incorporation of technology allows educators to explore innovative pedagogies that encourage collaboration, co-creation, and personalised learning.

Embracing technology will not be without its challenges. However, we live in a knowledge-based society and those who use data have benefited from turning it into actionable information. To stay relevant and innovative in the digital world, schools may need to encourage data competency among students and teachers, evaluate the right technology for the school's context to enhance learning, and manage ethical concerns arising from data and technology integration.

In a world where entire industries are undergoing rapid transformation driven by digital disruption, it is important that schools and the education workforce do not stand still but continue to evolve and adapt.

Technology has influenced how, when and where work happens. While technology has changed institutional landscapes, it has also created more jobs that require value-added insights, or simply put, human skills. Skills such as empathy, adaptability, entrepreneurship, initiative taking and the ability to negotiate will increase in demand. Employers are now seeking candidates who are resilient, innovative, collaborative and can solve problems. Schools should consider building a strong career education that prepares students for work and for life.

As the nature of teaching and learning continues to evolve, teaching will need a collection of innovative pedagogies that can be implemented in the daily life of classrooms. Teachers will need to continue to use evidence-based data for teaching and assessing and look beyond the classroom for innovative practices that enhance the learning experience.

The research cited in this paper shows that teachers who are evaluators, change agents and seekers of feedback will have the greatest influence on student achievement in the future. Greater 'symbiosis' between teachers and technology-enhanced learning will be important in the future as this facilitates experimentation with pedagogical methodologies. School leaders will be called upon to consistently reskill and upskill their teachers in areas such as digital literacy and design thinking, and soft skills such as organisation and management through targeted professional learning.



Given the complexities of the school environment and changes in the education landscape, leaders who exhibit authoritative and distributive leadership characteristics will potentially drive quicker and more successful innovation. Empowering staff members from all levels of leadership and teams is essential for the successful development and deployment of initiatives. Strategic foresight, such as scenario planning, can allow school leaders to recognise and adapt to potential changes in the internal and external environment. More importantly, schools should continue to connect with all stakeholders and create an inclusive strategic plan to move further and faster in any transformational change initiatives.

The future of education is uncertain. But if we have the right vision, the right priorities, and continue to ensure our prime focus is on students, these uncharted waters can be successfully navigated by school leaders, school systems and the broader society.

The challenge of crafting education into the future is one all educators must confront for it is the youth of today who will solve the difficult problems of the world. As educators it is our task to ensure they have the relevant skills and competencies to develop as global citizens.



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ISV promotes choice in education and champions the values and autonomy of Member Schools. It does not manage schools – it represents, supports and provides services to them so they can provide the best possible education.

ISV advocates for excellence in education for all students and for the right of parents to choose how and where their children are educated. It has always advocated that funding for schools should be based on the needs of the child.

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‘A strong Independent education sector demonstrating best practice, providing excellent outcomes for students and choice for families’.

To realise this, we:

- advocate for excellence in education
- champion Member Schools
- support quality education
- protect the right of parents to choose where and how their children are educated.

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