No one does it like you

Canon

THE FUTURE OF EDUCATION

THE DISRUPTION REVOLUTION

METHODOLOGY

In its foundation philosophy of *kyosei* — living and working together for the common good — and to start a new conversation about the future of education, Canon Australia commissioned writer, broadcaster and academic Dr Sunil Badami to undertake an investigation of the current discussions and issues in education; to discover what the future of education might be, and the best ways to approach the myriad possibilities and opportunities of tomorrow.

Research for this project began in March 2018 over a twelve-week period, with over 100 hours of surveying, compiling and annotating nearly 300 academic articles and government white papers, specialist and general media reports and educational literature covering both theoretical and current issues in education.

Nearly 20 hours of interviews were conducted with participants featured and quoted in the white paper, as well as follow-up interviews and correspondence.

Participants were selected for their experience in all educational sectors – primary, secondary and tertiary – as well as both private, independent and public schools.

They were also selected for their prominence and achievements as commentators, campaigners, thought leaders, policy makers, administrators, mentors and educators.

Participants were asked up to 50 questions, which covered issues such as the challenges facing education today; the role technology and business might play in education; teaching and learning; engagement and outcomes; assessment and pedagogy; innovation and change; funding and government policy, including the release in April 2018 of the report into the Review to Achieve Educational Excellence in Australian Schools (popularly known as “Gonski 2.0”).

Questions were also tailored to participants’ individual areas of experience and expertise, as well generally regarding the futures of working, teaching and learning. These interviews were recorded, either on digital audio or on film, and professionally transcribed.

Questions were framed by the findings drawn from this wide range of research, hopefully providing possible discussion points to start new conversations about the future of education, rather than positing any definitive answers.

As Dr Badami has discovered in the course of this enlightening learning journey, it is not simply any “right” answer that we need to seek, but new ways of asking different questions: for it is in these questions we can not only discover knowledge, but come to *understanding*.

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THE DISRUPTION REVOLUTION

‘MAY YOU LIVE IN INTERESTING TIMES.’

– CHINESE CURSE

It’s a time of incredible change: the Disruption Revolution. Like the Information and Industrial Revolutions before it, everything from technology to politics and industry to society is being radically disrupted beyond our imaginations, fundamentally changing the ways we live and work far faster than ever before.

Old certainties are being pushed aside by new uncertainties. Ideas and issues that once seemed science fictional may now become potential realities in only a few years.

Autonomous vehicles. The rise of artificial intelligence. Interplanetary colonies. Therapeutic gaming that changes behaviours and addresses cognitive disorders.

And with them, unprecedented challenges. Climate change. Automated manufacturing. Mass extinctions.

The prospect that almost half of the university degrees studied today and between one fifth and half of all occupations could be obsolete within the next decade.

But while so much has been profoundly transformed, despite a number of recent reviews, reports and reforms, why does it seem that education is struggling to keep up?

As education consultant Dan Haesler points out,

‘while the world changes quickly, education typically moves quite slowly.’

But even though it is one of Australia’s fastest growing exports, and can offer extensive economic benefits, both individually and nationally, as futurist and researcher Phil Ruthven contends,

'the price of education has risen as outcomes have fallen, while the price of most other goods and services have fallen as their quality has risen.'

What implications and consequences do these issues of funding, equality, and falling outcomes have for Australia's long-term economic competitiveness and social cohesion — much less the lives and wellbeing of millions of children for generations to come?

The discussion is now going beyond economic measures and standardised assessment metrics to the philosophical heart of what education means:

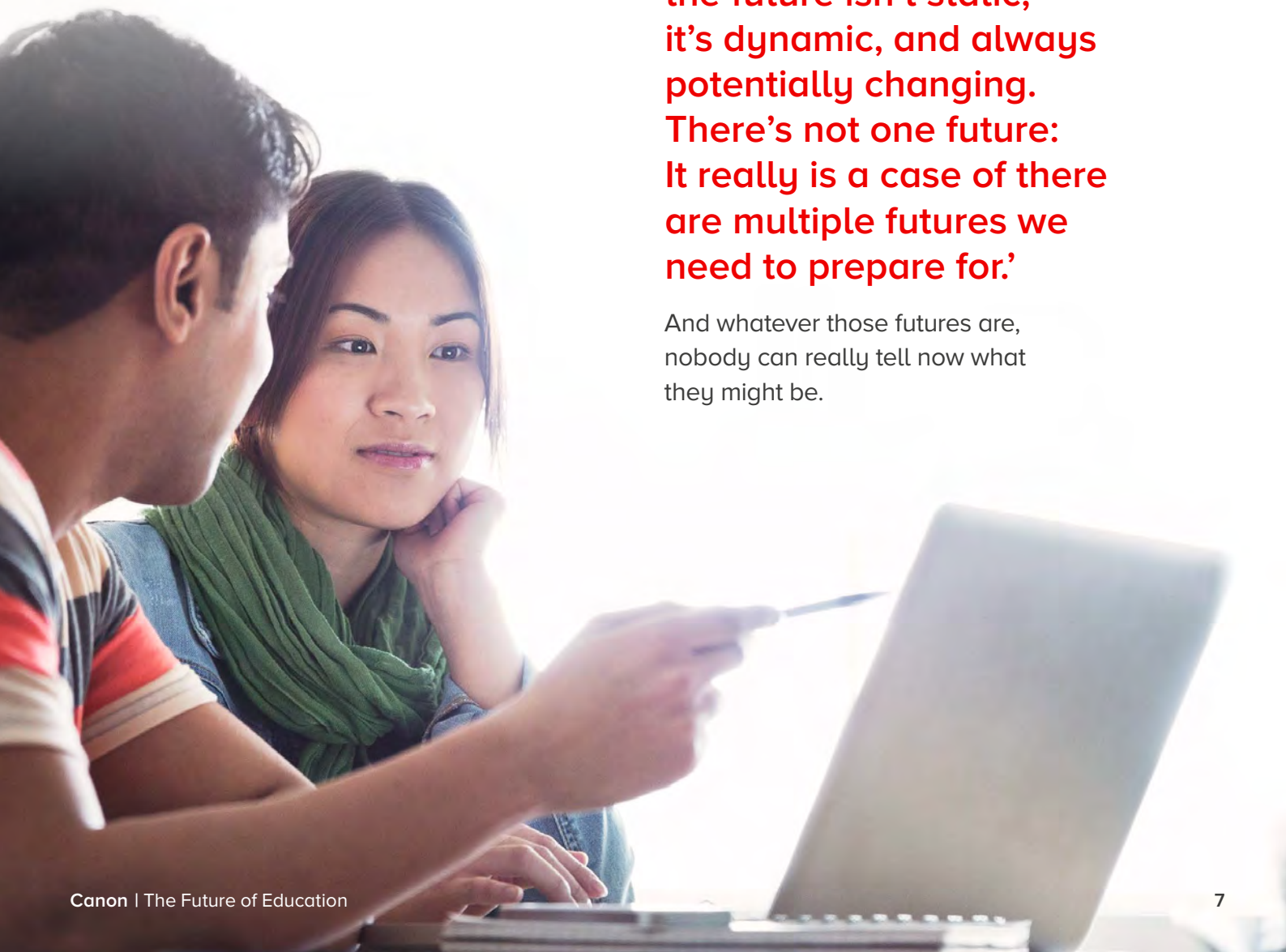
not just what it should do, but what it can enable students to do — and more importantly *be*.

As a result, right now, there's no hotter topic, reflecting the concerns, anxieties and expectations of many teachers, parents, students and policy makers grappling with questions such as: How can we make education relevant to students and their needs today? And how can we help them not only survive the challenges of an increasingly uncertain future, but to *thrive?*

But what future might that be? As Director of Future Schools Alliance, Peter Hutton, notes,

'the first thing we've got to acknowledge is that the future isn't static, it's dynamic, and always potentially changing. There's not one future: It really is a case of there are multiple futures we need to prepare for.'

And whatever those futures are, nobody can really tell now what they might be.



To find out what the future of education might be, Canon Australia set out in the spirit of its founding philosophy of *kyosei* — living and working together for the common good — to ask the kinds of questions to spark a new discussion in which different and diverse voices can come together to ask how we can face whatever challenges these potential futures might offer.

What are the biggest challenges facing education today?

What kind of future can we help students shape today to lead tomorrow?

How can we address these challenges in readiness for the opportunities of tomorrow?

What role can technology play in the future of education?

How can education today prepare students for these many potential futures?

How can business and education engage with each other?

How can we make education relevant to students today, and keep up with the demands of an ever more rapidly changing world?

What should we be learning, how should we be learning, and *why* should we be learning?

How can parents, students and teachers navigate and negotiate the immense imminent changes happening today, and those we can't even imagine tomorrow?

What will the role of schools, universities — and education itself — be in a world potentially without traditional careers, or work as we know it today?

To consider these questions, we investigated and researched the issues and challenges in education today, surveying current debates in news and specialist education media; reviewing government and NGO reports and academic studies and papers; attending a number of symposiums and conferences; and interviewing a wide range of experts, policy makers, academics and teachers, to find out: What's the state of working, teaching and learning today? What might the futures of working, teaching and learning be?

And how might they affect and influence the future of education tomorrow?

WHAT ARE THE CHALLENGES FACING EDUCATION TODAY?

In addition to extensive research of current theories, debates and issues in the media, academic and educational literature, we spoke to some of Australia's best known and most respected academics, consultants, policy makers, commentators, and frontline primary, secondary and tertiary educators.

These included former NSW education minister and Director of the Gonski Institute for Education, The Honourable Adrian Piccoli; commentator and education campaigner Jane Caro; consultant and coach Dan Haesler; innovative educators Peter Hutton and Tim Lloyd; futurist, researcher and author Phil Ruthven, and more.

What did they think were the biggest challenges facing education today?

'One of the biggest challenges facing education today is that our educational institutions are unwilling to make the sometimes radical changes that are necessary in order to keep up with the changes that are happening in our industries.'

– Associate Professor Bem Le Hunte
Course Director, Bachelor of Creative Intelligence and Innovation, University of Technology, Sydney

'It's always a big challenge to decipher what the best approach might be. But there are other challenges — the big debate now over whether or not standardised testing is the best approach. If we do endorse new ways of teaching, learning and assessment like learning progressions, that's going to be a new challenge in itself. It can be disruptive — the way different approaches will impact in practice on teachers and students. Ongoing improvement is so important, but it needs to be backed by research and evidence.'

– Ian Tobitt
Head Teacher, Teaching and Learning, NSW Department of Education

'We've got to concentrate our efforts on equity. The more equitable the system is the more it actually leads to greater performance across the entire system. That just makes intuitive sense — if you've got fewer issues at that bottom end, it enables you to put more effort into the middle and top. But how do we make the system more equitable, how do we narrow disparity, how do we ensure a student's background doesn't determine their success at school or beyond?'

– The Honourable Adrian Piccoli
Director of the Gonski Institute for Education, University of NSW

'The biggest challenge in education right now is students' mental health. I don't think we adequately recognise that doing well at school may at times undermine your wellbeing. Striving to do well at school can often mean that you're not sleeping well, that you're not making friends, that you're not spending time in nature, that you're not relaxed and calm. We pay lip-service to wellbeing but we don't assess it, and for many students, if it isn't assessed, it doesn't matter. Until it's recognised, we're going to be in an environment where doing well at school may lead to some students becoming less healthy, and that's the big issue.'

– Miles Campbell
Founder and CEO, Teacher Training Australia

'The biggest challenge in education today is a lot of the rhetoric around education: that it's all about funding or it's not; or it's all about Gonski or it's not; or it's public versus private. Australia has more resources than most OECD countries when it comes to education. But the funds, the experience, the expertise, the different perspectives are all siloed away. Everyone's running their own race, rather than seeing education as a collective, social responsibility.'

– Dan Haesler
CEO, Cut Through Consulting

'The biggest challenge in education today is workload for teachers, and the complexity of the job now for young teachers coming into the profession. There's no real framework to advise or support these young teachers, and they're getting a little bit lost.'

– Teacher of gifted primary students

'I think the biggest challenge facing education today is to make sure that every child in Australia has an equal opportunity to develop their potential. We are falling very short on doing that.'

– Jane Caro
Author, commentator and education campaigner

'The biggest challenge for education today is breaking out of the current paradigm — the idea that 1000 hours of school class-time each year is worth far more than the 4800 waking hours each year a kid spends out of class, as though it's only what happens in class that's relevant. That's just ridiculous. We need to move to "anywhere, anytime learning," especially as kids start demonstrating a bit more independence, responsibility and autonomy — just as they'll have to when they leave school.'

– Peter Hutton
Director, Future Schools Alliance and former principal, Templestowe College, Melbourne

'The challenge now is for society to start taking the problems of today, and the challenges of tomorrow, more seriously. We need government action, we need action with corporates, and we need action with universities to start to change these things. It is time to act.'

– Brian Bailey
Technology Innovation Manager, Faculty of Arts and Social Sciences, University of Sydney

'The HSC is basically a way to easily select particular students. But does it prepare them for university? And what about after that? So for me, the biggest challenge in education is asking: what if education, especially higher education, was a transformative experience enabling a broader range of students to reach their full potential?'

– Professor Sherman Young
Pro Vice-Chancellor, Learning and Teaching, Macquarie University

'If you look at education, productivity growth — the increase in output per hour worked — has for years been negative in comparison to most other industries. It's ironic that something that's supposed to make us smarter is not all that smart itself, at least in productivity terms — it needs to be much higher quality at a much lower price.'

– Phil Ruthven
Futurist, researcher, author and founder of IBISWorld and The Ruthven Institute

'The biggest challenge facing education today is the preparing of students for a world that's constantly evolving and changing on a daily basis. That's the one constant, and our students and staff need to understand that to face that challenge.'

– Tim Lloyd
Principal, Plumpton High School, Sydney

HOW CAN WE ADDRESS THOSE CHALLENGES?

'We need to start thinking about lifetime education. We need to provide systems to support people for their whole lives. We really need to address the way we fashion our education system for people who have left the school system. We need alignment between the public sector, the private sector, the not-for-profit sector, the vocational colleges and universities. We all need to work together if we're going to make Australia a country that will thrive in this uncertain future.'

– Brian Bailey

'One of the things we need to re-engage with is the issue of apprenticeships and traineeships, which have over time been whittled away. We've had this mentality that every student needs to go to university. But that approach has drastically diminished choices and opportunities for students with talents in those vocational or trade areas, as well as reducing those skilled workers in society, whom we need badly.'

– Tim Lloyd

'One of the biggest contributors to student mental health and wellbeing issues is technology — how kids use it, and how much they use it. It's not going away, so it would be great if we started to see technology being redesigned to offer more positive impacts and influences and helping support mental health in users, especially this entire generation of kids — and those to follow — for whom it's such an integral part of their lives, and will take an even greater role in the future.'

– Miles Campbell

'Take away at least 50 per cent of the workload — the administration and record keeping and all the rest — so we can actually concentrate on our core business, which is teaching and learning. Parents want outcomes, the government wants outcomes, so put us back in classrooms so we're teaching. But it's not only about the teachers — it's about the children. You can't have good outcomes for children if you don't have them for teachers. If you have a happy, relaxed, motivated, upskilled teacher, you'll have happy, relaxed, motivated kids.'

– Teacher of gifted primary students

'If we're going to address all the challenges education in Australia faces today, particularly around issues of equity, one of the best things we could do would be to remove the politics from education. Because that just taints everything. We should be working together, not against each other.'

– Dan Haesler

'We've always targeted the top and bottom ends of the achievement spectrum, but what if we addressed the middle? When I was education minister, we had a "bump it up" strategy, where we focused on schools with more than 50 per cent in the middle two bands of achievement. Basically, we realised that if you targeted the middle, you'd get great results. And that's what happened. We had a huge bump in results in those schools, bringing everyone up.'

– Adrian Piccoli

'Assessment is absolutely critical in education. You've got to know where the students are in their learning. But rather than working by current, summative assessments like standardised tests which say students should be at a particular level of achievement by a particular age, we're now looking at learning progressions — analysing where individual students are on a scale. It's not based on what year they're in — there's no point teaching new concepts until you've ensured students have already mastered the foundations.'

'So a learning progression is a lot better way to assess the students. It's more challenging, and it requires a lot of professional learning to teach teachers to be able to assess where students are at and customise the way they deliver their lessons to those students.'

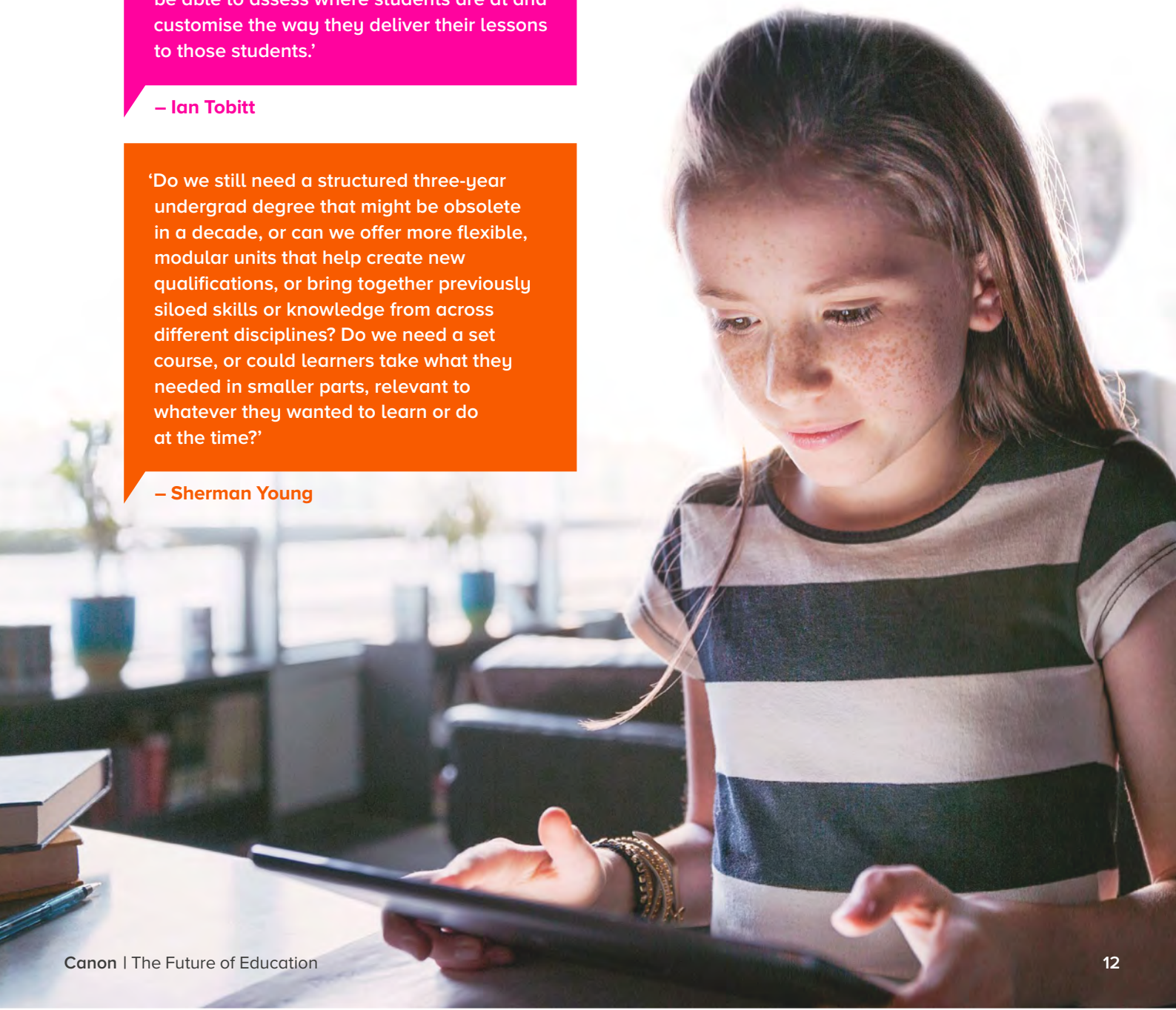
– Ian Tobitt

'Do we still need a structured three-year undergrad degree that might be obsolete in a decade, or can we offer more flexible, modular units that help create new qualifications, or bring together previously siloed skills or knowledge from across different disciplines? Do we need a set course, or could learners take what they needed in smaller parts, relevant to whatever they wanted to learn or do at the time?'

– Sherman Young

'Universities are about to enter a brand-new lifecycle in the 2020s — perhaps only five years away at most — which will run beyond the middle of this century. It will be the fifth such lifecycle since the 19th century. Tertiary education is currently at its most expensive, and it's going to have to undergo a radical reformation. I think we're going to see the end of the current model of largely public universities. There'll be more universities operating — as many do already— on a more corporate basis, in partnership with industry. There'll be mergers. Some will be listed on the stock exchange. It's so inefficient now, something has to change.'

– Phil Ruthven



THE FUTURE OF WORKING

‘THE HIGHEST REWARD FOR A MAN’S TOIL IS NOT WHAT HE GETS FOR DOING IT, BUT WHAT HE BECOMES BY DOING IT.’

– JOHN RUSKIN

What’s the biggest concern for parents, students and policy makers regarding education today? Top of the list is what kind of job it will prepare children for tomorrow — much less if they will even get one.[1] As Director of Future Schools Alliance, Peter Hutton says,

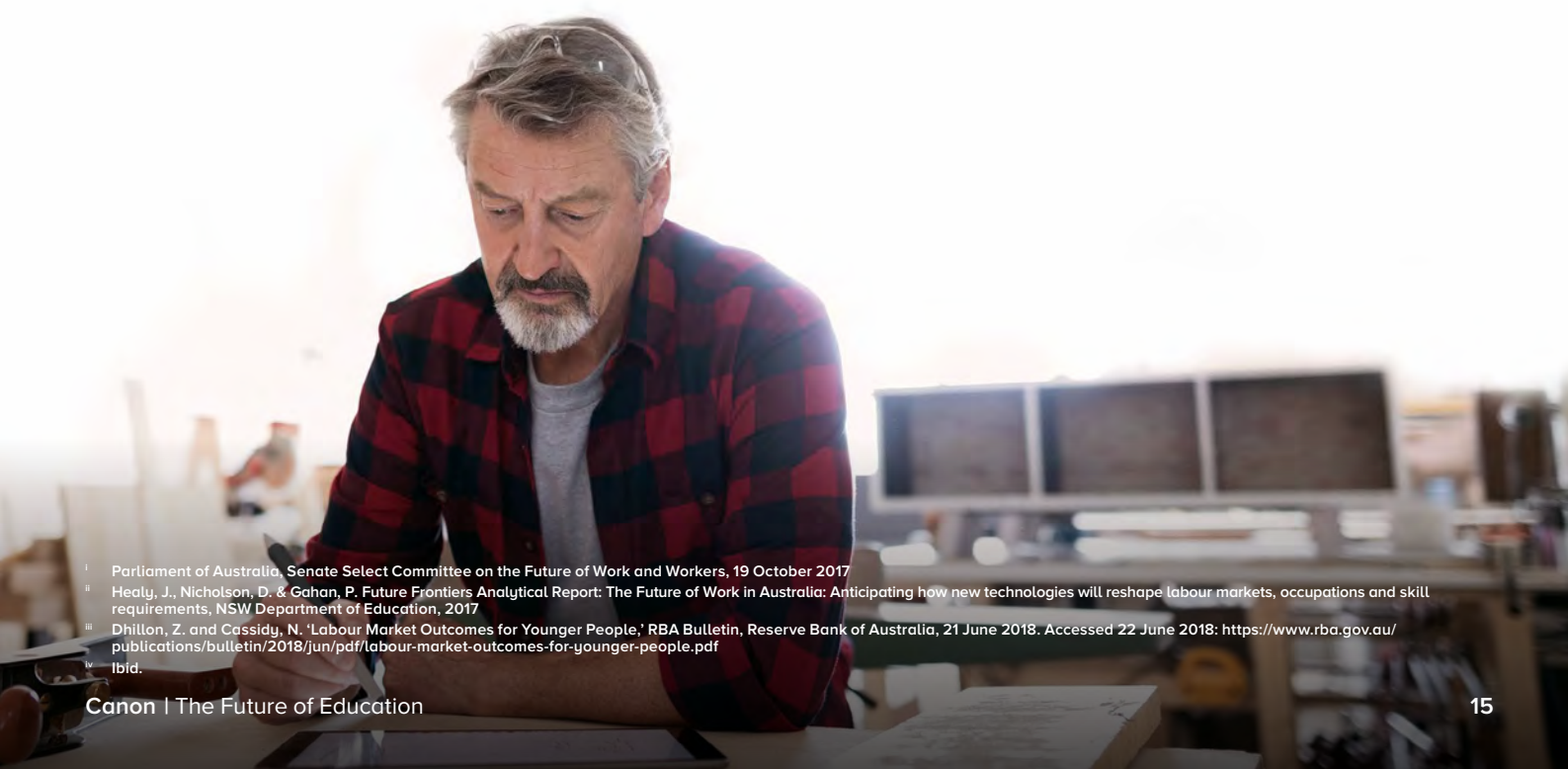
‘the old future that you go to school, get good grades, get into uni, get a good job, buy a house and all will be well, just isn’t true anymore.’

Such is the concern that the Australian Government established a Senate inquiry on the Future of Work and Workers[i] in October 2017, and the NSW Department of Education published a report, *The Future of Work in Australia*,[ii] in March 2018.

With the increasing casualisation of work caused by the growing “gig economy”, Australian youth unemployment has risen to unprecedented heights.[2] As education consultant Dan Haesler points out, ‘Underemployment is as high as it’s ever been. Even though raw job figures seem to be quite encouraging, the quality of those jobs is very poor. So we probably need to rethink what employment looks like.’

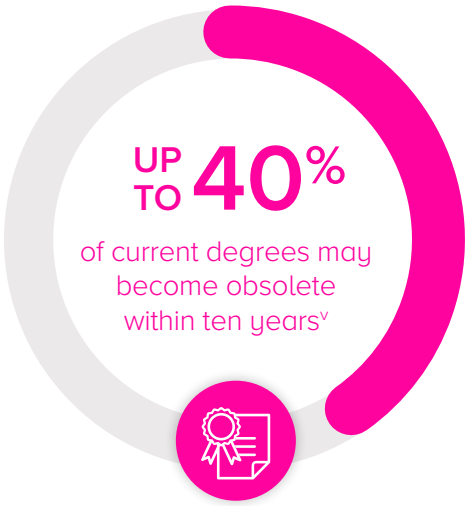
And a uni degree or three isn’t a guarantee of getting a good job anymore.[3]

While university graduates have traditionally enjoyed a lifelong earnings premium over non-graduates,[4] now less than 70 per cent of new graduates find full-time employment[iii] within four months of graduating. Median starting salaries have dropped by 15 per cent since the 1980s,[iv] and up to two-thirds of new graduates face prolonged periods of part-time or unemployment[5] in their chosen professions.[6] And the phenomenon of “degree inflation” — in which more and more tertiary qualifications are needed in an even more competitive jobs market — effectively renders them less and less valuable in terms of pay per qualification.



i Parliament of Australia, Senate Select Committee on the Future of Work and Workers, 19 October 2017
ii Healy, J., Nicholson, D. & Gahan, P. Future Frontiers Analytical Report: The Future of Work in Australia: Anticipating how new technologies will reshape labour markets, occupations and skill requirements, NSW Department of Education, 2017
iii Dhillon, Z. and Cassidy, N. ‘Labour Market Outcomes for Younger People,’ RBA Bulletin, Reserve Bank of Australia, 21 June 2018. Accessed 22 June 2018: https://www.rba.gov.au/publications/bulletin/2018/jun/pdf/labour-market-outcomes-for-younger-people.pdf
iv Ibid.

The rise of the internet and automation have resulted in job losses in a range of industries, such as retail, manufacturing, mining and agriculture,[7] with predictions that up to 40 per cent of current degrees may become obsolete within ten years,[v] and between 20[vi] and 47 per cent[vii] of jobs could potentially be lost to automation and AI within the next twenty.



But while this may make for terrifying headlines, many projections about job losses don't take into account the way work has transformed,[8] or what new jobs will be created as a result of new technologies, with many potential new opportunities for different, better jobs in fields that didn't even exist a few years ago,[9] and even more that don't even exist yet,[10] where, for every job lost, ten more have been created.[viii]

And we'll still need people to do the face-to-face relationship-building jobs[11] automation can't, like health care, the arts, politics — and most importantly, education.[12]

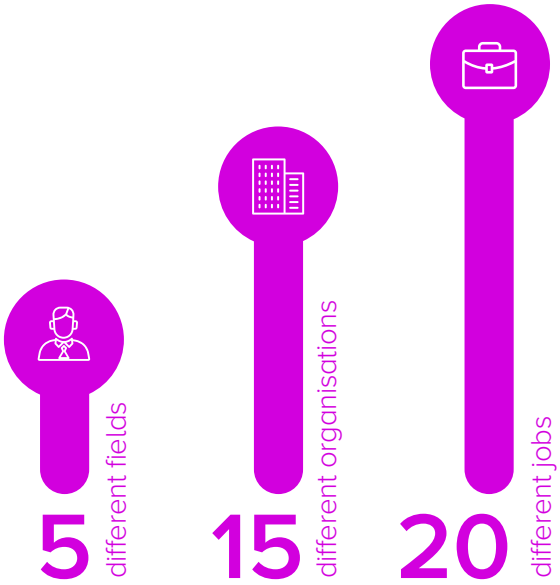
While machines will increasingly take over many of the routine jobs many of us don't want to do, the worker of the future will need uniquely human attributes that machines don't have, such as the "Four Cs" – creativity, collaboration, communication and critical thinking – as well as other crucial non-cognitive 21st century "soft skills" like curiosity, imagination, creativity and empathy.[13]

But although many analysts[14] and policy makers[15] believe there should be more focus on so-called STEM (science, technology, engineering and mathematics) subjects and skills, growth in purely STEM professions such as mathematics, physics and programming have actually declined, with some, like NSW Minister for Education Rob Stokes, calling the emphasis on STEM 'a fad.'[ix]

For educators like Professor Sherman Young, Pro Vice-Chancellor of Learning and Teaching at Macquarie University, introducing arts and humanities subjects such as philosophy, history, sociology and anthropology, as well as creative arts like languages, dance, drama, music, visual arts, design and new media to STEM — making it STEAM — offers a more holistic, flexible and creative approach to not only learning a diverse range of skills, but how to innovatively combine them, revealing and fully realising the intersections between "scientific" and "creative" disciplines, and the influences they have on each other, to create 'a new way of thinking that is engaging, multifaceted and inclusive, with diversity of representation and thought' to solve real-world problems — just like in the real world.

[v] Cawood, R. et al, Can the universities of today lead learning for tomorrow? Ernst & Young Australia, Sydney, 2018
[vi] Schneider, P., Bakhshi, H. et al, The Future of Skills: Employment in 2030, Pearson & Nesta, London, 2017
[vii] Frey, C. B. & Osborne, M. The Future of Employment: How susceptible are jobs to computerisation? Oxford Martin School, University of Oxford, Oxford, 2013
[viii] Patty, A. 'Jobs of the future – how safe is your occupation?' The Sydney Morning Herald, 5 September 2015
[ix] Stokes, R. 'Challenging the STEM orthodoxy,' 2018 Annual Queenwood Balmoral Lecture, 21 March 2018

Encouraging more engagement between educational institutions and business, Young points out that 'all work is trans-disciplinary today. Macquarie has an experiential learning program, PACE[16] — our Professional and Community Engagement program — which requires every undergraduate to have a work-integrated learning experience with external partners, so students can have a real experience of that creative mashing together of different disciplines and approaches.'



Millennials are likely to have more than one career, with some research suggesting they'll have up to 20 jobs with 15 different organisations in five different fields.

But what other capabilities or qualities will the worker of the future need? In addition to job-specific skills, they will have to be entrepreneurial, nimble, resilient, creative, flexible and mobile. Given that life expectancy for millennials is now almost double their great-grandparents',[x] and, according to futurist and researcher Phil Ruthven, their working lives will last nearly three times as long, they'll likely have more than one career, with some research suggesting they'll have up to 20 jobs with 15 different organisations in five different fields.[xi]

Many millennials are already "job hopping"[17] between different organisations and careers, changing jobs three times more than their parents did,[xii] with many now part of a globalised, transnational economy, whether working via the internet or across the world.

[x] Bump, P. 'Here's how much longer each generation will be sticking around,' The Washington Post, 24 January 2017

[xi] Salt, B. '5 ways the Australian workforce has to change, according to Bernard Salt,' SEEK Insights & Resources, June 2015. Accessed 20 June 2018: https://insightsresources.seek.com.au/5-ways-australian-workforce-change-according-bernard-salt

[xii] Ibid.

And with such long working lives, and change happening so fast and continuously, workers of the future will need to constantly update and reskill to adapt or repurpose existing skill sets in new ways, deepening specific expertise with a broad range of skills.

As a result, they'll need to have a growth mindset[18] of lifelong learning,[19] continually seeing — and seeking — new opportunities to learn and grow beyond school, college or university to add value to their careers and stay competitive and relevant.

They'll need good interpersonal and social skills,[20] being able to collaborate and communicate, to resolve conflicts and to work with a diverse range of people in a wide range of jobs, workplaces, industries, locations and cultures.

As commentator and education campaigner Jane Caro says, 'if you're very good at building relationships, if you're a pleasure to have around, if you're great to work with, you're going to find it much easier to transition from one career to another. If you want to get through life, have good social skills. That will get you everywhere.'

KEY LESSONS

- **The biggest concern for parents, students and policy makers regarding education is work — what jobs will education prepare students for? And will they even get one?**
- **University degrees are no guarantee of a good job or better salary anymore**
- **Increased casualisation and underemployment, falling wages growth, the disappearance of whole fields and occupations — with the possibility of more becoming obsolete in only a few years — adds to this anxiety**
- **Despite concerning headlines, more jobs are being transformed and created than lost**
- **Millennials and the generations to follow are already moving between jobs and careers at a pace greater than their parents and grandparents did**
- **They'll have far longer working lives, far less job security and will need the "Four Cs" and non-cognitive 21st century "soft skills" to keep working, including:**
  - **Creativity**
  - **Critical thinking**
  - **Collaboration**
  - **Communication**
  - **Adaptability**
  - **Resilience**
  - **Curiosity**
  - **Interpersonal skills**
  - **A mindset for lifelong learning**
- **Jobs that will survive the Disruption Revolution will be human, face-to-face occupations that can do the creative and relationship-building things computers and robots can't**

WHAT DOES THE FUTURE OF **WORKING** LOOK LIKE?

1 THE FUTURE OF WORK EMBRACES THE OPPORTUNITIES OF TOMORROW BY ADDRESSING THE CHALLENGES OF TODAY

Rather than viewing the future with fear, we need to embrace the many opportunities that it will bring. If we have the right skills and mindset to take advantage of them, we can enable future generations to not only survive the Disruption Revolution but to *thrive*.

But we can only do this by addressing the challenges we face today. Old pedagogies, instruction and assessment models that don't work anymore. Growing inequality in access and outcomes. Rising dissatisfaction and anxiety.

While there's been a lot of discussion about instilling crucial "21st century skills" in students to make them creative, collaborative, nimble, autonomous and adaptable, how can our education system do so when it's very often the opposite?

We need to offer teachers and learners more autonomy and flexibility to change and adapt it as circumstances and needs require.

WHAT IF:

- **We made learning individual, flexible, needs and interest-driven, rather than simply concerned with narrow, standardised outcomes?**
- **We targeted funding, infrastructure and support to those schools, communities and learners who need it most, to raise standards and performance across the entire system?**
- **We encouraged different jurisdictions and sectors to become more collaborative and communicative, to share insights, expertise and learnings?**

'Innovation in education is about disrupting the way we deliver learning. It's about delivering the curriculum in a completely radical way.'

– Bem Le Hunte

'Education needs to be relevant to kids today and it needs to be future focused, and kids need to see a purpose for it or they're going to ask "Why are we learning this?" It's got to allow for flexibility and creativity, for teachers and learners.'

– Teacher of gifted primary students

2 THE FUTURE OF WORK FOSTERS INDUSTRY ENGAGEMENT

Many primary and secondary educators are wary of "edubusiness" — the monetisation of education by industry — but if education is to prepare learners for working life, it makes sense for schools to engage more with industry to help learners understand how business works and how to work and collaborate in real, working environments.

So what can business get from engagement with education?

By helping educators to create the kind of people so many businesses want right now and in the future — creative, collaborative, consultative, resilient, adaptive, problem-solving and with good people and communication skills — businesses benefit by getting the right kind of people to help improve productivity and profitability, especially as qualifications become less important than personal qualities.

WHAT IF:

- **Education and business worked together to make graduates more work-ready when they leave school and uni through mentorships, work experience, or even co-designed subjects or curricula with real-world learning?**
- **Business played a more constructive and consultative part in education, helping education align more closely to help create the kind of workforce they need?**
- **Education was vertically integrated, meaning that the boundaries between education and work were not as distinct, allowing learners to work as they learn, and workers to learn as they work?**

'There's real value in authentic partnerships between education and business. Businesses typically have a broader view of the world than the education system. So recognising that jobs are changing, the economy is changing, the skills that the kids will need — it's actually quite useful to be able to engage with business and hear that from the front line.'

– Dan Haesler

'It's very important that universities understand what industry wants from graduates. So why can't companies do more to co-design or co-deliver a course? Why wouldn't you have an IT or computer science degree co-designed and developed in conjunction with tech companies? That's definitely an opportunity to explore in the 21st century, as corporations look for more than theoretical qualifications.'

– Sherman Young

3 THE FUTURE OF WORK IS ABOUT BEING, NOT JUST KNOWING — AND UNDERSTANDING, NOT JUST DOING

With more information than ever before more instantly available than ever before, and technologies and industries changing more profoundly, faster than ever before, knowledge is both more easily accessible and more provisional than ever.

As a result, the things we learn today may be redundant tomorrow. We don't need to memorise knowledge, we need to know how to use it. And with so much "fake news" and "alternative facts", we'll need to critically interrogate this deluge of information to make it useful.

What role will teachers have in the Disruption Revolution? Teaching will become less about imparting knowledge and more about helping to curate it, mentoring and nurturing learners beyond being taught to know something — to learning how to *be* more.

Fearless. Resilient. Nimble. Mobile. Curious. Creative.

WHAT IF:

- **We spent as much, if not more, time on instilling, developing and nurturing the "Four Cs" and other "soft skills" as much as we do the "Three Rs" and academic knowledge?**
- **Curricula, individualised learning plans and other learning experiences helped learners to develop crucial non-cognitive capabilities like concentration and resilience, creativity and curiosity — as well as other skills like problem-solving and task-related skills?**
- **Instead of assessing learners on what they don't know or can't do, or penalising them for making mistakes, we encouraged them to learn from them?**

'Change is happening so fast that your knowledge is more provisional now than it ever was. We need to go beyond knowledge. We need to go to the whole being, the whole person.'

– Bem Le Hunte

'Students can't just be robots regurgitating information. It may have worked in the past but we need new solutions for new realities, and now, they need to develop problem-solving skills. They need to be able to communicate well. They need to collaborate and work well with other people. They need empathy, and flexibility, and creativity.'

– Ian Tobitt

WHAT ROLE CAN TECHNOLOGY PLAY IN EDUCATION?

'Technology will play a very significant role in the future of education, in the way that it's played a significant role over the last 20 years or so. Except that we need to harness the disruption. It will be increasingly difficult to separate technology from education. The fact that we still do so today indicates that we are still working it out.'

– Brian Bailey

'I think technology is why we're recognising that joy, curiosity, fun and imagination are so vital. You can see little tiny kids learning so quickly how to use smartphones and tablets, and being attracted to games, and starting to teach themselves to read simply because they want to enjoy and interact with something they find amusing. Children are hardwired to learn. We just need to give them fun things to learn.'

– Jane Caro

'Technology brings people together. Look at the mobile phone and the ability to use a mobile phone to communicate, whether in the middle of India or the middle of Australia. One of those great advantages of being able to communicate is you can start engaging with what's happening around the world. So hopefully more of that will happen in the future, if we use technology responsibly, and teach our students to do so too.'

– Tim Lloyd

'It's interesting that the cost of education continues to rise as the price of technology keeps falling. But the internet isn't the answer to everything, especially when it doesn't have adequate capacity or speed, for those isolated communities that it can't reach, or those disadvantaged kids who can't afford technology, much less upgrades.'

– Phil Ruthven

'Technology can amplify what's happening in education. If things are happening well in education, it will amplify that. If things are happening badly, it will amplify that too. And it can amplify inequality, especially in regards to those kids in remote or disadvantaged communities who don't have as much access to tech as kids in more central or affluent ones. Without getting the infrastructure right, the ideology right, the intent right, we won't see too much progress.'

– Dan Haesler

'Using computers in class and all the amazing things you can do on the internet have undoubtedly enhanced education experiences and delivery. But there are definitely issues around screen time and what impacts it has on the concentration, sleep and other behavioural and wellbeing issues. And if technology makes kids lazy learners — dependent on Google or machines to know or do stuff without understanding how they do it — then I'd be really concerned. More than anything, the thing kids will most need are interpersonal skills to be able to get those human-related jobs that'll be in demand — and if that's affected by screen time or technology, then we have to work out how to ensure that technology doesn't affect that.'

– Adrian Piccoli

'We already provide lecture material and other content online, but does every university in the world need to create that content or should we share it? Should we actually be putting our time and energy into doing something more useful rather than all developing a bunch of basic 101 content? Wouldn't it be interesting to have a degree that was co-delivered by Macquarie and Stanford or other prestigious or innovative partners, where the interactions were online and the students got to meet each other?'

– Sherman Young

'As artificial intelligence improves, it will be able to take over lots of the mundane, granular, linear stuff — from marking attendance to marking itself, from maths questions to spelling and grammar, allowing teachers more time to teach, or to consider the subtexts or articulacy. It could even start monitoring non-verbal cues in kids, to see how they're responding to teaching or engaging in learning. Although it won't replace the relationships teachers have with their students, it will be interesting to see how it develops.'

– Ian Tobitt

'Technology does allow governments and corporations to measure and retain big data on students. If that's not carefully managed and monitored, it could further entrench the current industrial model of trying to conform students to "ideal" outputs. We've got to be really careful to use it in appropriate ways that accelerate a student's growth and understanding of themselves in ways that they want to go.'

– Peter Hutton

THE FUTURE OF TEACHING

‘NOBODY CARES HOW MUCH YOU KNOW UNTIL THEY KNOW HOW MUCH YOU CARE.’

– THEODORE ROOSEVELT

What do you most remember about school? Teenage angst and first loves aside, it’s likely it’s that one amazing teacher who changed your life.

As education consultant Dan Haesler observes, ‘it’s not because they were brilliant at teaching their subject — although that probably helped — but because they were brilliant at *teaching*. It’s that they were interested in you, that they cared, that they made you feel like you belonged, that you were worth something.’

How much of an impact can a good teacher make? Studies have shown that a good teacher is probably the most important factor in a child’s education,[xiii] especially with more children spending more time on a daily basis at school with their teachers than they do with their often busy, harried parents, and with teachers increasingly expected to do more of the things — like discipline and counselling — that parents once did.

[xiii] Bruns, B. & Luque, J. Great Teachers: How to Raise Student Learning in Latin America and the Caribbean, World Bank Group, Washington, D.C., 2014, p 5

A good teacher can be even more important than going to a good school.[xiv] According to respected University of Melbourne education researcher John Hattie, while student ability accounts for about 50 per cent of learning outcomes, the second greatest influence is the teacher at 30 per cent.[xv]

And it comes with far-reaching economic benefits. A number of studies suggest that a single, highly effective teacher in primary school can increase earnings at age 28 by 1.65 per cent[xvi] — with that lifetime effect compounded further by similarly good teachers.[xvii]

As Adrian Piccoli, former NSW education minister and Director of the Gonski Institute for Education, observes,

'I don't think individual parents care much about systems or sectors or reforms or whatever. They're more concerned about the adults who are dealing with their kids, and the quality of those adults.'

But given how important teachers are to our children, society and the economy, why is it becoming increasingly difficult to attract the best and brightest to the profession, much less retain them?

It's not hard to see why. Teaching is hard, with many teachers putting in far more hours than just classroom time[21] for not much reward and even less regard in a job that has become increasingly complex and demanding.[xviii]

This stress and exhaustion has resulted in a growing teacher attrition rate, with 1.6 times more burnout than the general population. Between 30 and 50 per cent of teachers leave the profession within their first five years,[xix] and in 2017, 21 per cent of teachers revealed they'd considered leaving in the previous three months.[xx]

This growing undesirability and lower standing in the community has resulted in steadily falling minimum entry scores[xxi] for teaching degrees, with Australian Education Union Federal President Correna Haythorpe saying 'we cannot expect young people who struggled at school to become high performing teachers.'[xxii]

According to Ms Haythorpe, such student teachers, while possibly having other qualities or experience that might make them good teachers, are more likely to drop out.[xxiii] Many graduates are unable to find teaching work,[xxiv] with up to 53 per cent of teaching graduates[xxv] not working in education and 20 per cent not even starting.[xxvi]

xiv Ibid, p 6
xv Hattie, J. A. C. 'Teachers Make a Difference, What is the research evidence?' Australian Council for Education Research (ACER) Research Conference, Melbourne, 2003
xvi Bruns, B. & Luque, J. Great Teachers: How to Raise Student Learning in Latin America and the Caribbean, World Bank Group, Washington, D.C., 2014, p 71
xvii Ibid, p 72
xviii Geiger, T. & Pivovarova, M. 'The effects of working conditions on teacher retention,' Teachers and Teaching: theory and practice, Volume 24, Issue 6, April 2018, pp 604–625
xix Weldon, P. R. The Teacher Workforce in Australia: Supply, Demand and Data Issues, Australian Council for Education Research (ACER) Policy Insights, Issue #2, ACER Camberwell VIC, March 2015
xx Velegrinis, J. & Jentz, H. ACE-ASG Teachers Report Card 2017: Teachers' perceptions of education and their profession, Australian College of Educators & Australian Scholarships Group, Melbourne, July 2017
xxi Australian Institute for Teaching and School Leadership Ltd (AITSL), Initial Teacher Education: Data Report 2016, AITSL, Melbourne, 2016
xxii Haythorpe, C. quoted in Education Matters: 'Call for minimum entry scores to teaching courses,' Edumatters Magazine, 2013. Accessed 27 March 2018: http://educationmattersmag.com.au/call-for-minimum-entry-scores-to-teaching-courses/
xxiii Haythorpe, C. quoted in Australian Education Union Media Release: 'New research shows why we need minimum entry scores for teaching courses,' 30 November 2015. Accessed 27 March 2018: https://www.aeufederal.org.au/news-media/media-releases/2015/november/301115
xxiv Australian Institute for Teaching and School Leadership Ltd (AITSL), Initial Teacher Education: Data Report 2015, AITSL, Melbourne, 2015
xxv Australian Bureau of Statistics (ABS), '4221.0 – Schools, Australia, 2017,' 02 February 2018. Accessed 29 March 2018: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4221.0
xxvi Stroud, G. 'Why do teachers leave?' ABC News, 06 February 2017. Accessed 18 June 2018: http://www.abc.net.au/news/2017-02-04/why-do-teachers-leave/8234054

But with the Australian Council for Educational Research predicting a surge of school enrolments by 2022 of 26%,[xxvii] what's the answer to rising attrition[22] and falling standards?

Futurist and researcher Phil Ruthven believes it's an opportunity to shake up the system.[23] 'We should be increasing class sizes, reducing teacher recruitment numbers, increasing salaries and standards,' he argues.

Under reforms instituted by Piccoli in 2016, NSW has made it mandatory for prospective teachers to have an ATAR of 75 or above,[24] as well as passing compulsory minimum literacy and numeracy aptitude tests to graduate.[25] Additionally, he called for caps on teacher recruitment,[xxviii] suggesting that teaching should be more like policing and nursing, only training the numbers they needed to fill vacant positions.

But while many occupations and professions in a wide range of industries are threatened by the rise of the internet, automation and artificial intelligence, teaching will be one of the few jobs to survive, as demand for new and fundamentally human skills rises — the interpersonal communication, imagination, collaboration and curiosity that machines don't have.[26]

[xxvii] Weldon, P. R. The Teacher Workforce in Australia: Supply, Demand and Data Issues, Australian Council for Education Research (ACER) Policy Insights, Issue #2, ACER Camberwell VIC, March 2015
[xxviii] Piccoli, A. quoted in Bagshaw, E. 'NSW government pushes national minimum entry standard for teachers,' The Sydney Morning Herald, 27 November 2016
[xix] Weldon, P. R. The Teacher Workforce in Australia: Supply, Demand and Data Issues, Australian Council for Education Research (ACER) Policy Insights, Issue #2, ACER Camberwell VIC, March 2015

As Caro says,

'teaching is one of those professions that won't become obsolete. The reason is that good teaching is about building good relationships with their students. You can't teach anybody anything unless you have a good, trusting relationship with them, which is what good teachers are really skilled at. No robot is ever going to be able to do that.'

And in an age in which there is more information more readily, easily and instantly available than ever before, the need for students to learn and memorise facts is diminishing.

'Are we just educating to fill people's heads up with facts?' asks Associate Professor Bem Le Hunte, Course Director of the Bachelor of Creative Intelligence and Innovation at the University of Technology, Sydney. 'Research has shown that you can do an exam, and if you do the same exam a few months later, the results will be very different — even lower. So what use is education if it's just about the repetition or replication of knowledge, and we're building consumers of knowledge, not producers of knowledge? That's not a very creative or innovative process, is it?'

With the growing role of technology in all aspects of life, especially education, teachers will have to adapt to new ways of accessing and processing information in ways that learners can relate to, in a transformative process Le Hunte calls 'the movement from knowledge to being. It has to be about creating being, not just knowing.'

'How do we create people who can manage change, who can handle uncertainty, who can think creatively and differently? Who can understand complexity, invention, and entrepreneurship? Who can create their own opportunities and understand how to solve the problems of the future? I think that's where education is most exciting, when you see that real transformation to *being* happening.'

As new technologies evolve and are superseded at an increasing rate, knowledge becomes more provisional than ever, and we are inundated with more and more information, much of it unreliable, what does this mean for teaching?

It will become less about imparting knowledge and more about helping to curate it, mentoring and nurturing the so-called "Four C" soft skills that the 21st century future workers will need, such as critical thinking, creativity, collaboration, communication, as well as curiosity, care, connection, community and compromise.[xxix]

[xxix] Tomlin, D. 'The ABCs of Middle Level Education: The New 22nd Century Cs for Education!,' Association for Middle Level Education, Westerville OH, 15 March 2017. Accessed 02 July 2018: http://www.amle.org/Publications/BlogABCsofMiddleLevelEducation/TabId/937/ArtMID/3115/ArticleID/793/The-4-New-22nd-Century-Cs-for-Education.aspx

For cognitive scientist Professor Guy Claxton, even the word "teacher" 'still carries that strong sense of telling: "I taught them something".'[xxx]

But as education becomes more learner-centric, and students become active, authentically engaged and autonomous learners, applying acquired, researched knowledge in practical, project-based ways to solve real-world problems, Claxton believes teachers should be called "learning designers".

As Megan O'Connell and Bill Lucas of Victoria University point out, educators will need to be 'coaches, critics and experts in learning... striking the balance between encouraging independent learning and providing students with guidance... and cultivating confident, curious learners who can take risks and learn from their mistakes, a variety of assessment methods and regular feedback loops to achieve quality learning.'[xxxi]

For CEO of innovative teacher training company TTA, Miles Campbell, 'teachers are going to need to become capable of living in the brave new technology world. And just as the tech will take care of so much of the linear drudgery and make teaching and learning so much more fun, with so much technology at your disposal, the possibilities will be amazing.'

KEY LESSONS

- **A good teacher has long-reaching, long-lasting economic and learning benefits — more than schools or any other factor**
- **Good teaching is about great relationships, and teaching will be one of the few relationship-based occupations that will survive the Disruption Revolution**
- **It's getting harder to recruit and retain teachers due to high stress, heavy workloads, increasing burnout and low standards and standing**
- **With information increasingly ubiquitous and easily accessible, the role of teachers will change from "experts" to "curators"**
- **Teachers' roles will shift towards mentorship, helping instil and nurture key "soft" skills, like curiosity, creativity, resilience, collaboration and critical thinking**
- **With such unprecedented change, where knowledge is increasingly provisional, education is transitioning from "knowing" to "being"**
- **As technology takes over the drudgery of mundane administrative, data and content collection tasks, teaching will increasingly become more about relationships and creativity**

[xxx] Claxton, G. 'The Learning Power Approach: Teaching students to teach themselves,'; 'Mind-Fit for life: designing the learning power classroom,' Edutech Conference, Sydney 07 June 2018
[xxxi] O'Connell, M. & Lucas, B. 'What if young people designed their own learning?' The Conversation, 11 May 2016. Accessed 15 June 2018: https://theconversation.com/what-if-young-people-designed-their-own-learning-59153

WHAT DOES THE FUTURE OF **TEACHING** LOOK LIKE?

1 THE FUTURE OF TEACHING SUPPORTS AND VALUES TEACHERS

You can't have great learning without great teaching. A teacher has more effect on educational outcomes than a good school, and is only second to learners' engagement and attitude in influencing outcomes and lifelong economic benefits.

Teaching will be one of the few human jobs to remain when many others are lost to economic or technological changes. But far too many teachers are overworked and overstressed, with high rates of burnout and low rates of retention. How can we address these challenges?

We can only increase teaching standards by increasing the standing of teachers.

WHAT IF:

- **We increased desirability by restricting teaching numbers, raising entrance scores, academic standards and salaries and only taking as many student teachers as teaching places?**
- **We reduced workloads, particularly in relation to administration and reporting, by employing more administrative staff and developing cloud-based and AI applications for automated content aggregation, personalised learning plans, data collection, analysis and reporting?**
- **We rewarded teachers for the *progress* their learners make, rather than penalising them for not achieving some arbitrary "norm" or mean?**

'The person who should be playing the primary role in learning is the person doing the learning. So, in that respect, students should be working harder than the teacher.'

– Dan Haesler

'There's a wonderful saying that I've always liked, which is the best thing a man can do for his children is love their mother. I think the best thing a society can do for its children is love their teachers.'

– Jane Caro

2 THE FUTURE OF TEACHING USES TECHNOLOGY TO ENRICH AUTHENTIC LEARNING, BUT NOT TO REPLACE HUMAN RELATIONSHIPS

There's no doubt that technology is playing an even greater role in our lives, especially for young people, who are more digitally literate than any generation before them. But if they're not learning what they're being taught, why can't we teach them in the way they learn, in the ways they engage with best?

With faster and more efficient data collection and record keeping, artificial intelligence, augmented and virtual realities and the development of therapeutic software to address cognitive and behavioural conditions, the possibilities for technology significantly enhancing the future of education are great — if used responsibly and in *human* ways, to ensure that crucial human skills are developed, not diminished.

WHAT IF:

- **We used games, VR and sandbox quests to enable learners to explore concepts, solve problems and develop skills so they can become fearless in taking chances and unafraid of failure, rewarded for progress with greater powers, trophies, booty and level ups, offering the same pleasure of gaming to learning?**
- **We used therapeutic games to address both educational and behavioural development and pathological conditions (such as depression, ADHD, autism or dementia) — in formats learners can engage and respond to, which may offer powerful ways to more effectively brain plasticise important cognitive skills?**
- **We helped learners to learn how to use technology responsibly, using it to augment their skills and get tasks done more quickly rather than becoming dependent on it, and mentored them to become responsible digital netizens?**

'Technology can play a big role in the future of education, if it doesn't remove the face-to-face element. Because there's something about being in a room with other people that allows ideas that didn't exist before to emerge.'

– Bem Le Hunte

'There are now generations who spend their entire life on screens. We have to understand that that's where they spend their life. A lot of the content that we deliver should happen digitally.'

– Sherman Young

3 THE FUTURE OF TEACHING ENCOURAGES AUTONOMY, AGENCY AND AUTHENTIC ENGAGEMENT

One key reason for parent, learner and teacher anxiety is powerlessness.

Powerlessness about the immense and imminent changes happening to technology, the economy and society. Powerlessness about what to learn and how to learn it. Powerlessness to do the things we do best.

How can we address this anxiety and powerlessness? How about empowering parents, learners and teachers, offering more autonomy and agency to local schools and communities and individual learners and teachers to find the best solutions for them, and to encourage them to become more independent and entrepreneurial?

How about teaching less but better, enabling learners to learn more and better by themselves? Rather than having education "done to them", what if we emancipated learners to take control of their own learning journeys, by working on subjects and projects they're interested in and want to do — rather than forcing them to do things they're not interested in or don't want to do — allowing them to apply the knowledge and skills they've learned in real, relevant ways?

WHAT IF:

- **We gave teachers, learners and schools more voice and choice to allow them to find the solutions they need most in ways they understand best?**
- **We let students take a bigger role in running their school and shaping it to suit their interests and needs?**
- **We enabled learners to design their own learning spaces, so that they could learn and build learning environments that truly suited them, researching and implementing ideas like budgets, materials, ergonomics, design and more to collaboratively and creatively find innovative solutions to relevant real-world problems?**

'We need to roll back the system so that students take a greater role in the running of their own school, and also having greater choice of the subjects that they study. Give kids the choice. Let them take control of and own their learning experience. Run a parallel program. So if a kid who still wants year levels and year-by-year progression, and you know they're happy doing that, let them — but for those kids that don't, allow them greater flexibility to come up with their own individualised learning programs.'

– Peter Hutton

THE FUTURE OF LEARNING

‘IMAGINATION IS MORE IMPORTANT THAN KNOWLEDGE.’

– ALBERT EINSTEIN

It’s clear to many educators, policy makers, teachers and students that, in this age of transformation, old ways of teaching are struggling to keep up with the immense technological, economic and social changes already happening in the Disruption Revolution.

As education innovator Larry Spence famously observed, ‘Plop a medieval peasant down in a modern dairy farm and he’d recognise nothing but the cows. A 13th century physician would run screaming from a modern operating room. But a 15th century teacher from the University of Paris would feel right at home in a [modern] classroom. Think where we’d be if agriculture had never improved — or medicine [or anything else]. Isn’t it strange that teaching hasn’t?’[xxxii]

‘This is the first generation of children I can’t prepare for the workplace because I don’t know what will exist when they graduate,’

a teacher of gifted primary students confesses.

So what will students of today need to learn to get a job tomorrow? Most educators agree that knowledge won’t be enough,[27] and tomorrow’s workers will need to learn how to be curious, independent, creative, willing to take risks, learn from failure — and to learn for life.

‘We’re all going to be students for life,’ Director of the Future Schools Alliance, Peter Hutton, points out. ‘And it won’t be about students, it’ll be about *learners*, and they’ll move in and out of learning very fluidly.’

[xxxii] Spence, L. D. ‘The Case Against Teaching,’ Change: The Magazine of Higher Learning, Vol, 33, Issue 6, December 2001, pp 10-19

But as a teacher of gifted primary students reflected,

'one of the things I've learned is that if you put limits on children, that's where they'll stop. It's very difficult for children to become autonomous learners in the current system because of the set limits. They don't learn to discover themselves as learners.'

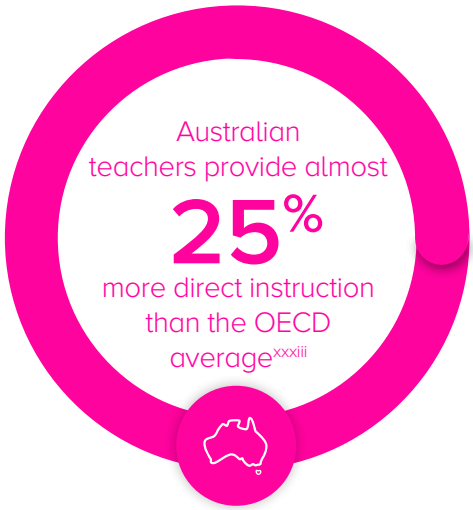
'As a teacher, you need to foster curiosity in students,' says Ian Tobitt, Head Teacher, Teaching and Learning at the NSW Department of Education. 'They're naturally curious. They're naturally hardwired to learn. You need to let them explore. If we're just teaching them to remember content, we're not really teaching the skills that they'll need in the future. We need to teach them how to overcome problems, come up with solutions, and work together.'

Many experts, such as Professors Ken Robinson[28] and Sugata Mitra[29] have talked about "student-centred" education, which focuses on learners, rather than outcomes. 'Raising educational outcomes might not be the point. What we actually want to do is teach children how to learn,' says commentator and education campaigner Jane Caro.

Despite Australian teachers providing almost 25 per cent more direct instruction than the OECD average[xxxiii] (and nearly 50 per cent more than their Finnish counterparts), teaching to standardised tests[30] like NAPLAN have resulted in declining international test scores,[xxxiv] educational outcomes,[xxxv] engagement[xxxvi] and student wellbeing.[xxxvii]

Perhaps, as Pak Tee Ng, Associate Dean, Leadership Learning at the National Institute of Learning in Singapore argues, 'teachers should teach less but teach better, so students can learn more and learn better.'[xxxviii]

One approach is student-centred, project-based learning, in which learners work creatively and collaboratively on relevant real-world problems, combining deep learning of abstract concepts with practical skills. According to CEO of teacher training organisation TTA, Miles Campbell, this gives learners 'a sense of autonomy and ownership, they're driving what they're doing, they care about the outcome, they are confident they can get success.'



xxxiii Organisation for Economic Co-operation and Development (OECD), 'Indicator D4: How much time do teachers spend teaching?' Education at a Glance 2014: OECD Indicators, OECD Publishing, 2014

xxxiv Organisation for Economic Co-operation and Development (OECD), PISA 2015 Results in Focus, OECD, 2018; Thompson, S., De Bortoli, L. & Underwood, C. 'PISA 2015: a first look at Australia's results,' Australian Council for Educational Research (ACER), Camberwell VIC, 2016

xxxv Hetherington, D. What Price the Gap? Education and Inequality in Australia, The Public Education Foundation, Darlinghurst NSW, April 2018; Hunhan, R. & Blumer, C. 'Australian schools are in "absolute decline" globally, says PISA report, ABC News, 7 December 2016. Accessed 10 May 2018: http://www.abc.net.au/news/2016-12-06/australian-school-performance-in-absolute-decline-globally/8098028; OECD, Education at a Glance 2017, OECD, 2017; Robinson, N. 'Students' falling test scores costing the nation $120b in lost GDP, report finds,' ABC News, 3 April 2018. Accessed 3 April 2018: http://www.abc.net.au/news/2018-04-03/students-falling-test-scores-costing-nation-in-lost-gdp/9610346

xxxvi Stone, E. 'Drumbeat to ditch NAPLAN is growing louder – and rightly so,' The Sydney Morning Herald, 6 May 2018

xxxvii Organisation for Economic Co-operation and Development (OECD), PISA 2015 Students' Well-being Volume III Overview, OECD, 2017

xxxviii Ng, P. T. Learning from Singapore: The Power of Paradoxes, Routledge, New York, 2017

‘When we say “student-centred”, many people think it means focusing on the student. I like student empowerment or emancipation, where students are actually taking responsibility for directing their learning,’

says Hutton. By taking a greater role in the running of their school and having a greater choice in the subjects they want to study, students can focus less on the things they can’t do, and more on their talents and interests.

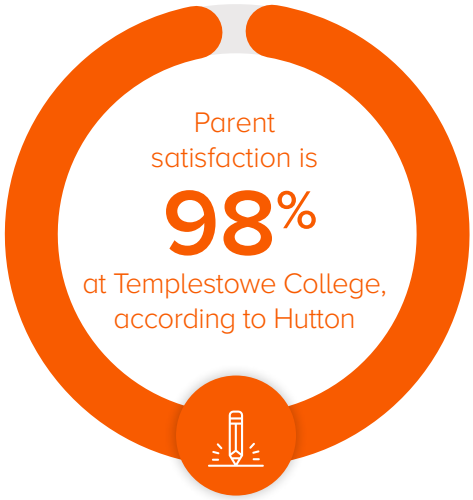
That enables them to enjoy the “authentic engagement” that educational consultant Dan Haesler says ‘is living a life high in interest, curiosity and absorption. If you’re engaged in your life, you’re pursuing your goals with determination. You’ve got a sense of belonging and investment, of voice and choice, of understanding and purpose. It actually makes you feel more alive.’

In schools like Sydney’s Plumpton High School or Melbourne’s Templestowe College, students have been given this opportunity to co-design their own personalised learning plans. Traditional silos between subjects and even year groups have been dissolved,[31] disparities have narrowed and engagement, wellbeing, achievement and satisfaction have soared — at Templestowe, parent satisfaction is 98 per cent, and student connectedness and engagement is in the 96th percentile, according to Hutton.

Plumpton’s principal Tim Lloyd has also engaged with industry to offer real-world work-integrated learning[32] and connections for students, with ground-breaking co-designed[33] subjects like media industry studies in partnership with the ABC,[34] leadership studies with Citigroup, and science and engineering with universities. This, he says, is ‘opening up networks, doors, opportunities — and preparing them for the real world.’

But it has to start early — even before formal instruction begins. Already, France, which has banned homework for primary school children,[xxxix] has now made school compulsory from the age of three.[xl]

Many experts, such as Finnish educator and Gonski Institute for Education fellow Pasi Sahlberg[xli] and Gonski 2.0[35] co-author Michael Roberts[xlii] are calling for exploratory, play-based learning[36] instead of formal instruction up to the age of eight.



[xxxix] Strauss, V. ‘French president pushing homework ban as part of ed reforms,’ The Washington Post, 15 October 2012; Jacob, P. ‘Minister announces changes to homework,’ The Connexion, 28 May 2017. Accessed 30 May 2018: https://www.connexionfrance.com/French-news/Minister-announces-changes-to-homework; Stockdale-Otárola, J. ‘Does homework work?’ OECD Insights, 30 November 2016. Accessed 30 May 2018: http://oecdinsights.org/2016/11/30/does-homework-work/

[xl] France 24, ‘France to lower compulsory school age from 6 to 3 years,’ 27 March 2018. Accessed 24 June 2018: http://www.abc.net.au/news/2018-03-28/france-to-lower-compulsory-school-age-from-6-to-3-years/9595884; ABC News, ‘French President Emmanuel Macron lowers compulsory school age from 6 to 3 years,’ 28 March 2018. Accessed 24 June 2018: http://www.france24.com/en/20180327-france-lower-compulsory-school-age-3-years-macron

[xli] Sahlberg, P. ‘When is the best age to start school? How about 7?,’ The Sydney Morning Herald, 12 June 2018

[xlii] Baker, J. ‘Dump science, history from K-3 curriculum, says Gonski adviser,’ The Sydney Morning Herald, 20 May 2018

This allows children the space and freedom to develop crucial cognitive, creative,[37] social and problem-solving skills — preparing them not just for school, but for a lifetime of learning beyond school or university in an engaging learning environment that instils concentration, rewards experimentation and encourages curiosity.

The NSW Department of Education is deeply aware of the need to prepare learners early for the future of learning and working in a constantly, rapidly changing world. The release of its report *Preparing for the Best and Worst of Times*[38] calls for education to go beyond easily assessable, job-specific knowledge,[39] and to the heart of student wellbeing.[40]

'Creativity is difficult to assess,' Lloyd acknowledges. 'As are problem-solving and collaborative capabilities. But we need to assess students' other abilities, like developing positive personal and professional relationships, being reflective and adaptive, being able to ask the right questions and more.' Just because we can't measure these things doesn't mean they aren't worth anything.

As Caro says, 'Finland didn't say "we're going to put raising educational outcomes at the centre". They put students and their wellbeing at the centre. That's the way to help kids learn best.'

KEY LESSONS

- **Old pedagogies and assessment models are failing to address immense changes and challenges in the Disruption Revolution**
- **Learners will need to become lifelong learners, constantly reskilling, upskilling and adapting**
- **Rather than job-specific skills or summatively assessed quantitative outcomes, education should start focusing on the whole person and give learners the freedom to explore, discover, fail and create**
- **Many experts are now calling for play-based learning in early years to instil non-cognitive capabilities and attitudes, such as problem-solving, collaboration and creativity before formal instruction starts**
- **Curricula should be student-centred, encouraging interests and talents to increase engagement, and assessment should be formative, showing progress, rather than summative, determining achievement**
- **Education should also be more vertically integrated, offering more opportunities for interaction between industry and schools**
- **Schools like Plumpton High School and Templestowe College have drastically decreased disparity, and increased satisfaction and retention with individualised, relevant learning**

WHAT DOES THE FUTURE OF **LEARNING** LOOK LIKE?

1 THE FUTURE OF LEARNING RECOGNISES EVERYONE IS DIFFERENT BUT OF EQUAL VALUE

For too long, education has been "industrial" — a one-size-fits-all approach that moves learners along at arbitrary, mandated rates, regardless of whether they have any understanding of or engagement with what's being taught. This approach categorises them according to standardised tests which only assess their ability to memorise often theoretical information rather than how to creatively and practically apply it.

Not everyone develops physically and mentally at the same pace, so why should we assume they do so academically?

Everyone is different, with different skills, talents, abilities and intelligences. So why assess all of these in the same way, especially when many of the skills and qualities we're trying to encourage and instil in learners are capabilities that can't be easily quantitatively assessed?

WHAT IF:

- **We offered individualised, formative assessment in a variety of ways, such as self-assessment and reflection, gamified rewards, and, potentially, AI tailoring of learning programs, to reflect these differences and different means of assessing them?**
- **Instead of penalising learners for making mistakes, we encouraged them to learn from them?**
- **We focused on wellbeing and engagement, rather than achievement and outcomes?**

'Kids aren't little competitive or achievement machines. They're not units of productivity. There aren't winner kids and loser kids. There are just human children, and they'll learn at their own pace and their way. All of them are of value, and teachers know that.'

– Jane Caro

'Ironically, one of the ways we could raise achievement in schools is to actually take the focus off achievement in schools. Once the measure becomes the goal, we're stuffed. NAPLAN's a great example — it was supposed to be a measure, but now it's become the target. And what we see is some kids being seen as liabilities in schools, because they're going to pull the data down.'

– Peter Hutton

2 THE FUTURE OF LEARNING STARTS EARLY AND BUILDS STRONG FOUNDATIONS

Given how crucial good early childhood is to future learning outcomes some countries such as France have now mandated that children must compulsorily attend school from the age of three, although this is without homework or formal instruction. And the NSW Department of Education agrees, publishing a report[xliii] on preparing kindergarteners for the Disruption Revolution with crucial non-cognitive "soft skills" and behaviours.

The gains made by good early childhood education can address educational disparities and inequalities far deeper, for much longer and more profoundly than any later remedial measures, to ensure that learners end up having more learning and career options later in life.

WHAT IF:

- **We made preschool compulsory, offering additional learning and socialisation resources to address any potential issues early, ensuring that any educational disparities are equalised by the time formal instruction starts?**
- **We encouraged children to love learning by making it play-based and fun, nurturing children's natural curiosity and creativity, without enforcing summative assessments or emphasising educational outcomes?**
- **We developed and instilled vital non-cognitive skills, and important capabilities such as resilience, problem-solving, concentration, creativity and adaptability to ensure learners were wholly ready for formal instruction — and beyond?**

'In the early years of infant school, the curriculum should be play based. It shouldn't be about educational outcomes. It should be about kids exploring, and having fun, and learning stuff, the way little kids are hardwired to learn things. When we emphasise raising educational outcomes, what we do is we take the joy and the fun out of learning. If you want to depress any kind of outcome, take the joy and the fun out of it.'

– Jane Caro

'Instead of starting with literacy and numeracy in kindy, why not instil those non-cognitive behaviours like problem-solving and creativity through play-based stuff, so you're ready for literacy and numeracy in Year 2? That's not changing the structure of schooling, but changing the structure of the delivery.'

– Adrian Piccoli

[xliii] Buchanan, J., Ryan, R., Anderson, M., Calvo, R. A., Glozier, N. & Peter, S. Preparing for the best and worst of times, State of NSW & University of Sydney, 08 May 2018

3 THE FUTURE OF LEARNING DEVELOPS AND NURTURES A LIFE-LONG LOVE OF LEARNING

How many little kids are excited about going to "big school", only to become bored, frustrated, or disheartened by it in a year or two?

The best way to encourage a love of learning and to foster creativity is to make it engaging, and the best way to do that is making it enjoyable.

Many experts say this is best done in early childhood, with play-based learning and no formal instruction or assessment until basic cognitive, social, literacy and numeracy skills are learned.

Singapore, whose education system is currently considered one of the world's best, offers financial incentives and subsidies for all Singaporeans over 25 years of age to undertake nearly 20,000 different approved courses to keep working adults' skills and competitive jobs appeal constantly up to date, ensuring greater mobility.

WHAT IF:

- **We allowed children to keep exploring and discovering through play, encouraging their imaginations and creativity in safe, fun environments until they're old enough to start formal instruction?**
- **We let kids learn what they're interested in, regardless of what potential "use" it might be, to encourage skills like concentration, curiosity, and a love of learning?**
- **We offered financial incentives or subsidies to mature learners to keep learning?**

'How have we still got this situation where we think all our learning's done in 13 years and then maybe a few more years of uni? We're all going to be students for life — we have to be. But it won't be about students, it'll be about learners, and they'll move in and out of learning in a very fluid way.'

– Peter Hutton

'You'll have to future proof yourself, however you do it. Upskill, reskill, cross-skill. Find other areas that you're interested in and build yourself a portfolio of amazing talents, and try them out. Be authentic in your learning. Don't just learn the theoretical side of things. Understand how you can apply your knowledge, and how your knowledge can be useful to the world.'

– Bem Le Hunte

WHO WILL THE LEARNER OF THE FUTURE BE?

'My crystal ball isn't working particularly well today, but depending on what we mean by the future — I wonder if the learner of the future even has to attend a school? I'm a huge fan of schools, but I wonder if a learner of the future will need to go to school for various aspects of their learning.'

– Dan Haesler

'We need to ensure our students have the ability to keep learning — if they only learn one thing, it's that they'll need to keep learning throughout their life. Learners shouldn't think that after they finish their undergraduate, or even post-graduate degree, that that's it and they're set for life. Education won't be a straightforward, linear progression — it'll be like life itself, full of diversions and digressions and doublings-back — and educational institutions need to reconceive themselves to adapt to that, offering more flexibility and fluidity.'

– Sherman Young

'When the job you have may not exist in a few years, and you may have a working life of up to 50 or 60 years, reskilling is going to be necessary your whole life. The difference is that you might update your skills with short courses or "micro credentials" relevant to whatever new job or career you want to do. With young people now potentially living and working much longer — with working lives potentially longer than their great-grandparents' entire lives — picking one career and sticking with it for up to 60 years just won't happen. And with more of us working less hours per year — whether through greater productivity or casualisation — we'll have more time to learn. We'll have to.'

– Phil Ruthven

'The learner of the future will have a range of ways that they can augment their learning — most likely digital, whether it's some futuristic YouTube, or more likely, some kind of immersive virtual or augmented reality, rather than just a screen. That fully immersive technology will offer experiences like live quests — whether in historical settings or simulations of work experiences — like, say, operations or rocket launches — for people to really "do" these things.'

– Peter Hutton

'The learner of the future will hopefully have the capacity to solve complex problems, both collaboratively and individually, using technology where it's appropriate to support problem-solving, but not relying on technology as the be-all-and-end-all.'

– Tim Lloyd

'What if learners were more integrated into wider society in the future? It seems odd that we prepare them for work and entering the world by keeping them cloistered from it. What if parts of their day or week included interaction with the wider community, enabling them — at the right age and level of maturity and development — to be more social, more fluid, and hopefully more engaged... even paid for actual, meaningful, authentic work related to what they're studying.'

– Miles Campbell

'Hopefully they'll be resilient — the biggest gift parents can give their children now is resilience.'

– Teacher of gifted primary students

'I hope that the learner of the future will be very good at navigating unknowns. Our generation have settled into jobs, and we've managed to navigate them throughout a lifetime, with a few swaps between careers. But for future generations, with much longer work lives and far more transitions and jobs, "careers" will be radically changed again and again and again.

'So the learner of the future is going to have to understand how to take their knowledge and translate and adapt it across many different fields. I hope that they're not just filled with facts when they leave university, because facts are easily forgotten. They'll actually need to be confident, creative and capable enough to adapt and flex and learn quickly on a need to know, just in time, per case basis.'

– Bem Le Hunte

'I hope the learner of the future is a warm, funny, curious, interested, passionate person with ideas, who feels confident that they have what they need to go and explore, and discover. I don't want them all to be tech wizards or geniuses. I want them to be good and decent people. I hope that the learner of the future knows there are as many ways to live an interesting life as there are people living lives. There's no one right set of beliefs, or one right way to be. I hope that they have respect for themselves and respect for other people. If we manage to get that with most of our kids — because we'll never get it with absolutely everybody — we'll be doing pretty well.'

– Jane Caro

'The learner of the future will be entrepreneurial; they'll be digitally literate; but most of all, they'll be *human*. They'll be able to collaborate with other people. They'll be able to communicate broadly and narrowly, both in written and verbal forms. They'll be able to be creative, and come up with ideas that machines would never come up with. They'll be critical thinkers. They'll be able to work their way through problems. We don't know what's around the corner, but we need people who can think, and who can drive the new future.'

– Brian Bailey

THE FUTURE OF EDUCATION

‘WE HAVE NOTHING TO FEAR BUT FEAR ITSELF.’

– FRANKLIN ROOSEVELT

The Disruption Revolution is a time of immense change. But it is also a moment of incredible promise.

While we must prepare for tomorrow’s many unimaginable challenges ahead, we can only do so by facing them today.

Inequality and disparity, falling outcomes and engagement, declining teaching standards and teacher retention are just some of the biggest challenges facing education today. They have never been more important or pressing, with long-reaching economic and social consequences for generations to come.

And we need new approaches to find innovative solutions to these problems — not just now, in the Disruption Revolution, but beyond it.

How can we address today’s issues while laying the foundations for future generations to not only survive the Disruption Revolution’s myriad changes, but to *thrive*?

By doing it together.

All of us, and all of our organisations — government, non-government, education and business — have a role in making our world a better place. A society is much more than an economy and a fairer, kinder, more equal society ultimately leads to greater prosperity and progress for everyone.

It’s reflected in Canon Australia’s underlying philosophy of *kyosei* — living and working together for the common good, in which helping each other means *everyone* benefits.

And it's reflected in thinking around the future of education. Rather than seeing education as a competition, what if we regarded it as an opportunity for transformation?

What if, instead of education being simply a transactional process of measuring achievement, it was a relationship of nurturing progress?

What if, instead of simply concentrating on what education — and students — can do, it contemplated what it — and learners — could be?

And what if, instead of demanding the "right" answer — as it has in the past — the future of education encouraged discovering different questions to solve the problems of today, and tomorrow?

Rather than teaching narrow, job-specific skills or focusing on limited, limiting, quantitative outcomes, we need to take a holistic attitude to all aspects of education, moving beyond simply knowing to being and becoming.

That means enabling and empowering learners to learn vital non-cognitive "soft" personal skills to help them confidently face whatever challenges or opportunities the future — or futures — may bring, so that they can not only survive, but thrive, and not only change the world but make it better for everyone.

But how can we encourage them to become confident, creative, curious, flexible, autonomous, collaborative and more, if their education is anything but these?

While recognising that as robots, computers, machines, automation, artificial intelligence and yet to be invented technologies take a greater role in our lives, education will remain one of the places which will still need that human touch.

And whatever approaches we take — from engaging business to employing technology, or student-centred learning to teacher autonomy — need to be addressed as a community together, in a dialogue rather than a debate, seeking common solutions that benefit all of us — most of all, our children.

But we have to start now, and we have to start early, to ensure that the next generation of children starting school can love learning for the rest of their lives, are aware of the Disruption Revolution's challenges, and are open to its opportunities so they can keep finding new ways to learn and live beyond it.

WHATEVER FUTURES LIE AHEAD, THE FUTURE OF EDUCATION NEEDS TO BEGIN TODAY.

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