LEADING INNOVATION,
NURTURING CREATIVE STUDENTS

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When you think of the great innovators in the knowledge age, the age we are preparing our students for, you think of the hugely profitable and socially transformative technology giants such as Google, Apple and Facebook. Whatever your thoughts are about the ethics and outputs of such companies, there is no denying the colossal nature of their achievements. Further, there is no avoiding the pace of change their accomplishments highlight, along with the future consequences for our students. Google attributes its success to the autonomy of thought it affords its people, along with its employment of ‘smart creatives’ (Schmidt et al, 2014). Notwithstanding the tyrannical reputation of its former head Steve Jobs, Apple has ensured its creative success in developing world-changing products by crafting physical and business structures that allow for diversity of opinion (Walsik, 2011). Indeed, the revolutionary feats of its earlier days in delivering the Apple PC to millions of homes around the globe is credited to the ‘rebel spirit’ of its employees, and the ‘free thinking technological radicals’ that inspired its products (BBC, 2011). Management practices at Facebook are focused on creativity, and leaders are seen less as ‘approvers’ and more as organisers in getting its ‘thinkers’ (employees) to participate (Jana, 2013). We, as educators, are increasingly recognising the importance of designing learning opportunities for our students that allow for deep thinking and creativity. How good, however, are our education systems at crafting environments of professional trust, freedom of creativity and entrepreneurialism in which their school leaders and teachers can truly innovate to address the challenges we face? This report is deliberately provocative. It does not ignore the moral imperative to focus on student growth in learning, nor does it conflict with the need for evaluative practice and evidence of impact. It does, however, ask its reader to imagine the school leader and teacher as disruptive innovator.

INTRODUCTION

According to the Australian Institute of Teaching and School Leadership (AISTL), a key area of professional practice for school leaders is leading and managing innovation and change. Aside from issues of education reform, this is particularly important in an era where educators are being asked to develop the creative thinkers and innovators of tomorrow. Last year, Geoff Masters AO, Chief Executive of the Australian Council for Educational Research, pondered ‘Is there another way to think of schooling?’ (Masters, 2016). He did so in the context of an unacceptably large number of low achieving students in Australia with respect to OCED standards, particularly in science and mathematics (Thomson et al, 2017), the very areas, as key features of ‘STEM’, that have been noted as central to the future prosperity of both the students and our economy (Prinsley & Johnstone, 2005; Education Council, 2015). There is certainly evidence that what we are currently doing, and even what we are moving towards, is not working (Allegre & Ferrer, 2010; Dumont & Istance, 2010). Masters’ commentary implies that there is need for radical change in the way our schools operate. This begs the important question: are our leadership practices responsive to the types of innovation needed to cultivate the learning skills needed in the 21st century and beyond? What are leadership practices that cater for radical change? Do our systems allow for such practices?
These are the questions I sought to answer on my study tour, looking at schools and organisations that do things radically differently and with great success.

**WHY INNOVATE?**
The case for change in what we teach and how we teach it is not recent. The Melbourne Declaration on educational goals for young Australians (MCEETYA, 2008), which recognised the need for Australian schools to equip students with skills to be internationally competitive in the ‘knowledge and innovation’ economy’ (p1), is almost a decade old. The mantra about new ways of teaching for a rapidly changing world is repeated throughout the literature (Beare, 2001; Christensen et al 2008; Fullan & Langworthy, 2014; Hargreaves, 2003: Istance, 2011; OECD, 2001, 2010, 2016; Peters, 2003; Robinson, 2011; Robinson, 2016; Wagner & Dintersmith, 2015; Wyn, 2007). The reasons for change are numerous and compelling, but feature most predominantly two aspects. Firstly, our schools are not adequately responding to learning opportunities provided by radical advances in technology. Secondly, our teaching is not arming students with the skills they need in the knowledge economy reshaped by Artificial Intelligence (AI).

Dramatic advances in technology continue to transform the ways that we operate, communicate, relate and create (OECD, 2010, 2016). Yet, while access to information and interaction via digital communication has become a non-negotiable for students at home and in their social lives, experiences with digital technologies may be ‘marginal in their daily education experience when they enter the classroom’ (Thomas et al, 2015 px). Indeed, research has shown that, even when used, the impact of technology on learning has been disappointing (Barber in Fullan & Langworthy, 2014). Further, technological innovations have meant that workplaces are outputting more, lives are becoming increasingly easier, however these rapid technology-related productivity gains are not replicated within our schools (Chatterji, 2017). In other words, ‘Everything else has accelerated but schools have not’ (Rosenstock in Fullan & Langworthy, 2014). This age of intense scientific and technological advance is also characterised by rapid obsolescence (Powell & Snellman, 2004), posing a challenge to the institutional way of thinking and operating in our schools. Do our systems allow our teaching to respond to the pace and demands of this era? That is, while technology is undeniably a feature of most classrooms, teachers and students may not use it, or may not use it effectively (Baylor & Ritchie, 2002; Christensen et al, 2008; Falck et al, 2015). Of course, there are good practices with mobile and other learning technologies, much of which are dependent on the disposition, aptitude and self-efficacy of...

The second critical aspect to the rationale for change is the move from the industrial to the knowledge economy, where knowledge is the central resource, and in which innovation, creativity and collaboration rule (Fullan & Langworthy, 2014). In such an environment, skills in science, technology, engineering and mathematics (STEM) are recognised as paramount for future success and prosperity (Prinsley & Johnstone, 2005; Education Council, 2015). However, debate lingers about pedagogical approaches for the integration of or treatment of these subjects in schools; debate which also questions the capacity of our education systems, which feature standardised assessment, rigidity in curriculum and attachment to traditional teaching methods, in accommodating effective STEM education at the school level (Williams, 2011). In addition, in a knowledge economy, an age defined by change and transformation, non cognitive skills that facilitate a disposition towards continual learning, problem solving, critical thinking and entrepreneurialism, are imperative (Fadel et al, 2015; Kautz et al, 2014; Tough, 2012). Entrepreneurialism begets entrepreneurialism, and studies have shown that teacher autonomy positively influences the development of non cognitive skills in students (Brunello & Schlotter, 2011).

REFORM DOES NOT EQUAL INNOVATION
Unfortunately, twentieth-century thinking is habitually applied to the debate around innovative pedagogies to address twenty first century skills (Shuck et al, 2016). This is not surprising, as it is difficult to achieve innovation within an institution that remains largely static (Resnick et al, 2010), as ‘the main modus operandi of school administration and instruction are resistant to change’ (Benavides et al, 2008, p28). That is, despite decades of education reform, not only are the basic features of our instruction largely untouched since the rise of mass systems of public education (Darling-Hammond 2015, Fadel et al, 2015; Robinson, 2016, Wagner & Dintersmith, 2015), our education systems, much like other institutions and corporate entities, continue to be grounded in principles of scientific management theory, or ‘Taylorism’ (Rose, 2016). In other words, in line with teaching instruction 100 years ago, our
students continue to be grouped by age, learning predominantly happens in a classroom, knowledge is
divided into distinct subjects, and student ‘achievement’ (or as Mazur (2016) and others would argue,
student ‘memory’) is measured by exam. In addition, management practices prioritising uniformity over
inventiveness prevail. Indeed, in some ways schools could be thought of as ‘factories of education’
(Rose, 2016) that have ‘brains’ at the top that direct the ‘hands’ (teachers) at the bottom. Indeed, with a
reform agenda preoccupied with outputs (i.e. student achievement against standardised tests), our
systems are progressively valuing sameness, consistency and standardisation, where adherence to
policies, plans and procedures is paramount. This is in stark contrast to the inventiveness and creativity
that we are aiming for in our children. Can innovation, particularly on the scale required in the era of
Google, Apple and AI, thrive in such an environment?

In this reform regime, educational leaders tend to impose system-wide programs that can be
burdensome, distracting and essentially unsuccessful in achieving improvement aims (Leicester et al,
2013). This problem is exacerbated by the emergence of new Taylorism (Wayne, 2011), where reforms
have arguably worked to de-professionalise teachers, replacing teacher agency with prescriptive curricula and
increasingly oppressive regimes of testing and evaluation (Priestley et al, 2013). Despite widespread understanding that
it is the teaching that matters most, there is a recognised phenomenon of ‘the disappearance of teaching and the
teacher’ (Biesta, 2013). That is, teachers (employees) are not considered craftsmen or artisans, but rather implementers of good practice as ordained by school executive (management) and those in other positions of knowledge and power within the wider school system. Instead, we exist in a climate of statistics and measurement in which we seem to concern ourselves less with what makes education good, and more with what makes it effective or efficient (Biesta, 2017). Although there have been powerful, evidence-based measures implemented in NSW (and nationally) to enhance the status of teaching as a profession, there appears little value, symbolically at least, for the innovator, the inventor, the entrepreneur within a system that requires teachers to abide by and be financially compensated according to a set of criteria (standards). Indeed the vast majority of teachers report the belief that any innovation they make would not be valued or recognised (OECD, 2012). By humbly basing our reforms on what ‘high performing’ systems have done in the past, and by prescribing what good teaching and good schools should, do or must look like, are we in danger of creating ‘Faster Horses’?
we are we in danger of creating ‘Faster Horses’\(^1\) (Schmidt et al, 2014)? That is, imitation in itself is not improvement (Cohen, 2016), and by emulating or even refining what others have done well, maybe we are missing an opportunity for our own greatness?

In the face of these difficulties, there are pockets of real educational innovation, where teachers and leaders are ‘challenging the stubborn roots of the traditional schooling paradigm’ (Hallgarten et al, 2015). Over and over again during the tour, I found that the conduit of real innovation in schools is the teacher or school leader. That is, transformative innovative practices do not occur as a result of system reforms (although can be assisted by them), nor in the delivery of top-down, approved practices... Rather, radical innovation of the type needed to deal with the problems outlined occurs in environments of freedom for creativity and entrepreneurialism.

**CASE STUDIES OF INNOVATION IN EDUCATIONAL LEADERSHIP**

The study tour ‘Leading innovation, nurturing creative students’ involved the case study of schools not only different from NSW schools, but also vastly different from each other. It also involved discussions with people at educational organisations, participation in a conference, and wide reading on the topic of innovation, reform and leadership (see reference list). The visits included:

- Shireland Collegiate Academy, Birmingham, UK
- XP School, Doncaster, UK
- PDST Tech in Ed, Dublin, Ireland
- Lacken National School, Cavan, Ireland
- Innovation Unit, London, UK
- Blue School, New York, US
- Institute of Play, New York, US
- SXSWedu, Austin, US
- Brightworks School, San Francisco, US
- High Tech High, San Diego, US

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\(^1\) In the book ‘How Google Works’ (Schmidt et al 2014), the analogy ‘Faster Horses’ is used to warn against incremental innovation based on ‘Me Too’ products. Henry Ford is attributed as saying “If I had listened to customers, I would have gone out looking for faster horses.”

Rosie Di Mattia

Leading innovation, nurturing creative students
Some of the pedagogical/education concepts, theories, practices, tools, technologies and influences observed included:

- Project based learning
- Inquiry learning
- Expeditionary Learning
- Neuroteaching
- Maker space
- Design thinking
- Tinkering
- Outdoor education
- Fieldwork
- Celebration of learning
- MinecraftEdu
- #HiphopEd
- Beautiful Work
- Games as pedagogy
- Culturally relevant pedagogy
- Reality pedagogy
- Creative Arts focus
- Kids as inventors
- STEM/STEAM/STREAM
- Drones
- Green screen
- Deeper learning
- Teaching for Adverse Childhood Experiences (ACEs)
- Coding/programming
- Learning for AI
- Immersion technology
- Robotics
- eportfolios
- Storytelling
- ‘Crew time’
- Audience learning
- GPS/radar
- Storytelling for empathy
- Socratic Smackdown
- Flipped learning

Rather than describe each experience in detail, the following section of the report will highlight the key understandings gained from the experience as a whole. A summary and synthesis of these findings are woven into a description of an ideal school, ‘future school’; a school that embraces innovation among its teachers and nurtures creativity in its students. Every aspect imagined in this conception of ‘future school’ is happening now; in schools internationally, in our own schools, or in the minds of academics and thought leaders that understand the urgency of the innovation problem.

**FUTURE SCHOOL**

**CREATIVITY IS A MINDSET**

Teaching in the ‘future school’ is seen as an act of creativity. School leadership encourages intellectual risk-taking and supports experimentation with novel, interesting approaches to teaching. Teachers are trusted as professionals, inventors and artisans, not deliverers of curriculum. Rather than as a means for ensuring unquestioning consistency among teams, collaboration is viewed as a vehicle for multiple viewpoints to be shared, deliberated and debated. Indeed, collaborative interdisciplinary partnerships among teachers are encouraged by design, and such partnerships are changed and rotated frequently.
Interdisciplinary here is key, as ‘innovation happens at the boundaries of disciplines’ (Wagner, 2016), and the subjectivity of subjects (Moore, 2010) is explored in the creative process.

‘Future school’ looks more like an art studio than an institution. The building, as well as the technology within, allows for collaboration, is open and full of inspiration and celebratory evidence of extraordinary learning.

Creativity needs sustained inspiration, and ‘future school’ teachers are regularly exposed to new research, thoughts, ideas and practices. Certainly, they are often participating in or leading research. Professional learning, however, is not seen as a ‘program’ or ‘pedagogy’ to be delivered, but rather stimulus for discussion, further study, personalisation and exploration. In ‘future School’ there is no definitive right and wrong way to teach, although teaching as a practice is continually interrogated and re-imagined. In this sense, good teaching is not seen as a formula or directive, but as a passion and commitment.

**LEADERSHIP IS INVENTIVE**

Innovation in leadership is encouraged at system level, and the ‘future school’ principal is given scope to genuinely remodel the management and organisation of the school. Excellence is not predefined, but continually strived for, and leaders are considered effective if they are able to articulate a clear vision of the future without dictating how to get there. At both school and system level, leaders believe that the best and most innovative ideas ‘bubble up’ from underneath, and endeavour to create a culture that unleashes good ideas and accelerates upwards communication (Zenger & Folkman, 2016).

**CURRICULUM IS FLEXIBLE**

‘Future school’ students are engrossed in fun, adventurous learning. Understanding that its students exist in a world where ‘knowledge is a commodity that is available to all with the swipe of a finger’ (Wagner, 2015 p20), the school system within which ‘future school’ operates has far less focus on the delivery of mandatory content, and far more on the humanistic value of education and on the art, science and ‘magic’ (Emdin, 2017) of human learning.

The school has an unfixed and evolving curriculum that engages, provokes thought and deeply educates. Teachers use real tools, real materials, and real problems to encourage students’ love of learning, curiosity about the world, ability to engage, tenacity to think big, and persistence to do
amazing things. Students, for example, are using three-dimensional geometry, calculus and physics to appreciate 20th century designer furniture and then design and create their own. They are applying knowledge of linear algebra, probability theory, statistics and data to produce AI software. They are debating the ethics and consequences of specific AI applications in real life, for instance, in the event of an accident in a self-driving car, should the car prioritise the safety and lives of its occupants over those of pedestrians (Stehlik, 2017)? They are creating Roman style frescoes depicting symbols of Australian identity and curating photographic exhibitions of cultural aspects in suburban street life. They are studying the aesthetics of and then building bikes, boats, bridges and staircases, and they are learning to fix the broken light in the classroom (Emdin, 2017). They are sampling classical music in their hip hop compositions about historical or modern social justice issues. They are inventing solutions for sustainable urban farming, and applying the fundamentals of sports psychology in their games and sports. Importantly, ‘there is not a text book in sight’ (Foley, 2017).

The basics of literacy and numeracy are prioritised, but the skills are applied in meaningful situations. Rudimentary competencies in arithmetic and phonics, for example, are taught using the tutorial, drill and practice of AI applications (ie digitally and individualised). ‘Real’ mathematics, however, is problematised in ways that students can see its real value as outlined in the examples above. Similarly, young writers in ‘future school’ write because they have something to say. They are so inspired by their learning about biotechnology and the impacts of the genetic modification of food that they write speeches, blog posts, articles and documentary scripts. They are moved by their studies of the works of Dickens and the industrial era issues depicted within them, and subsequently write their own dystopian novels or films about future society in the knowledge economy. Students make their way voraciously through classics and modern literature, book-club style. The aim of this type of study is not to interpret meaning in order to pass a test or comprehend a text type, but to enlarge their worlds, broaden their historical perspective, build empathy, elicit ethical examination and develop extended cultural capital. Above all, the aim is to instil a love of reading so that students can continue to explore and question ideas, and enrich their knowledge base, throughout their lives.

Curriculum at ‘Future School’ is inspired and inspiring. It caters for its diverse student community not by ‘dumbing down’ subject matter, but in finding innovative and creative ways to ‘support up’ student understanding, making learning irresistible. Unencumbered by narrow obligatory and standardised content, curriculum and pedagogy can also be culturally and contextually relevant and responsive to current events. The program of study is deliberately broad and varied, and is above all intended to
surround students with ideas; new ideas and ideas that have guided human beings and shaped civilizations for thousands of years. By interrogating these ideas, forming their own, and relating these when participating in and producing fascinating work, students develop mastery in both cognitive and non-cognitive skills.

**EVALUATION AS ASSESSMENT**

‘Future school’ exists within a system that recognises the paradox of trying to understand an individual by ignoring their individuality (Rose, 2016). That is, evaluation (rather than assessment) of learning in ‘future school’ is not obsessed with averagarian concepts of type and rank, and the limitations that can arise from measurement against a standard. Instead, it does a better job at recognising the ‘jaggedness’ and multi-dimensional nature of learning and attainment, and respects (without a deficit view) multiple pathways and timeframes in achieving competence, or excellence. To ‘know students and how they learn’ is genuinely prioritised and considered central to evaluation of learning. Assessment, as well as learning, is personalised and individualised.

All teachers in ‘future school’ are evaluative thinkers. Program evaluation and teacher self-assessment are embedded as highly valued, essential practices, but are not burdensome. Importantly, innovation is one of the criteria against which teachers and schools assess themselves.

**TALENT IS PARAMOUNT**

Teachers at ‘future school’ are akin to the ‘smart creatives’ of Google, and so they should be. They are required to relentlessly reconceive, re-envision and repurpose pedagogy, and to understand that ‘what works best’ yesterday doesn’t necessarily work best today. The profession is recognised for the importance it holds in this era of uncertainty, and attracts the very best and brightest because it is renumerated accordingly. It is acknowledged that teachers who are creative problem solvers can produce students who are creative problem solvers, and in any case the biggest problem to be solved is ensuring students are acquiring the intellectual and non-cognitive skills needed to be comfortable with and succeed in the inexact and shifting world in which ‘future school’ exists. To say that this requires innovation and creativity is an understatement.
FUTURE SCHOOL IS NOW

It is clear our students today will operate in the ‘New Work Order’ in which every job that currently exists will either be changed or become a thing of the past (FYA, 2015). As adults, our current students will be required to be ‘smarter’; that is, they will be continually learning on the job, they will be thinking critically, problem-solving, communicating and using science and mathematics. In short, it will be an economy in which intellectual activity is an essential element of work. This fact in and of itself highlights the truth that in a world where knowledge (or thought) is power, our students need to be ‘better’ educated.

In the age of AI and the rise of automation and robotics, it is also more important than ever that our future adults understand what it is to be human. I recently overheard a well-regarded science teacher, an individual charged with shaping the delicate minds of our future leaders, question the value of learning about history. This lack of insight is disquieting. It is only in learning about the successes and failures of the past, and in understanding how people and societies behave, that we can recognise motivations and societal drivers that impact on our present and future. An understanding of people and ethics is fundamental in an environment of scientific progress. We need to appreciate, then, that the purpose of education is not solely about preparing a future technologically-capable workforce, but a discerning, perceptive and informed workforce as part of a society that faces unprecedented moral challenges. A ‘better’ education, then, will ask students to engage with as many ideas as possible, and facilitate deep, broad learning experiences.

In truth, what really makes a ‘better’ education has almost certainly not yet been defined. In addressing the innovation era problems we face, we need transformational or ‘galactic’ thinking (Schmidt et al, 2014) rather than the incremental thinking usually applied in leading school improvement. NSW DoE has invested heavily in thinking about the future of education; commissioning reports, providing greater access to research, statistics and information, and highlighting exceptional models of practice in its Futures Learning unit. Perhaps by placing a more intense focus on innovative thinking among our teachers and school leaders we can continue more rapidly in the direction of our goal – to be the leading, high performing education system of the innovation era.
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i Brightworks, San Francisco http://www.sfbrightworks.org/
ii Institute of Play, New York https://www.instituteofplay.org/