Leading Educational Systems and Schools in Times of Disruption and Exponential Change

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Leading Educational Systems and Schools in Times of Disruption and Exponential Change: A Call for Courage, Commitment and Collaboration

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Leading Educational Systems and Schools in Times of Disruption and Exponential Change offers deep insight into the complex, metrics-dominated and radically evolving contexts in which leaders are currently immersed. Professor Duignan cautions us about pursuing old solutions to new challenges and constructs a compelling case for how leaders might adopt radically *new* approaches to their work. While the scale of this challenge can seem overwhelming, Patrick Duignan reveals the breakthrough opportunities it presents. He draws on the wisdom of authentic leadership research to guide contemporary leaders towards human-centred and values-guided clarity, when their moral compass might otherwise be spinning wildly in these times of unparalleled change. Professor Duignan's insights apply to leadership generically but he applies them in depth to educational contexts. This is a ground-breaking work of hope, purpose, progress and inspiration for all educational leaders.

Dr Greg Morgan
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In this book, Patrick Duignan provides a comprehensively researched account of the need for change in the way we approach educational leadership. His challenge is for us to act with urgency despite complexity and ambiguity, and to withstand the pull of gravity dragging us back to a safer, more orderly version of schooling. What education systems do, how they do it and the way in which they are led must change or else those education systems will become irrelevant. His firm belief in the role of ethics, human-centred learning, leadership that is authentic and positive cultures provides the stability that will help us to navigate the unknown. Duignan provides an essential resource for educational leaders that is designed not to spook or preach but to stimulate and motivate.

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Foreword

We are living in an age of disruption and exponential change, times that, arguably, the world has never seen or experienced before. These disruptions include big data, artificial intelligence, machine learning, blockchain, robots, digital automation and an explosion in the speed of connectivity, all of which are emblematic of what has been termed, 'The Fourth Industrial Revolution'. According to Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, this revolution of skills and technology is disrupting almost every industry in the world (World Economic Forum, 2017). It extends from energy to education, mining to manufacturing, aviation to agriculture and it is pervasive and relentless.

In the context of education and schooling, the dynamics of the fourth industrial revolution bring with it a number of educational challenges, potential paradoxes and the need to re-imagine dominant assumptions, practices and beliefs about the ways in which we learn, teach and lead. These include the speed and duration of learning, the nature of knowledge boundaries, the role of the educator and the educative process; the continual tension of addressing and balancing equity and excellence; and an ongoing commitment to the personal formation of the individual and the utilitarian value of the current models of schooling informed by the toolkits of a former industrial age. The French Nobel Prize (2014) winning economist, Jean Tirole, points out that we must anticipate the challenge that has come with the digital revolution so we can adapt to it, adjust and thrive rather than merely endure as we have with previous discernible revolutions (Tirole quoted in Frydenberg, 2019, p. 2).

A challenging question, therefore, arises: Are the education and schooling sectors prepared to embrace this fourth industrial revolution? In his book, *Leading Educational Systems and Schools in Times of Disruption and Exponential Change: A Call for Courage, Commitment and Collaboration*, Patrick Duignan provides a well-crafted narrative about the 'why', 'how' and 'what' of the fourth industrial revolution, especially the implications, opportunities and possibilities for the education and schooling sectors. Duignan issues a 'call to action' – a 'clarion call' for a distinctive form of system and school leadership to not only survive but to thrive in these disrupted and uncertain times; he concludes that educational leaders at all levels will be required to act with *courage, commitment* and a willingness to *collaborate*. He uses this leadership frame to explore and analyse contemporary educational leadership practices, by providing commentary and analyses from a diverse range of sources, and makes a series of recommendations

on ways in which educators and educational leaders can achieve transformations in the architectures of schools and schooling; pedagogy for rapidly changing educational environments; and technological connectivity and networking for a future that is presently unimaginable. He claims that educational leaders, including teachers, will need to change their leadership theories and practices if they wish to remain relevant and successful in a constantly disrupted future.

Duignan encourages leaders in education to be braver, to lead with new mindsets; rethink their assumptions; question the relevance of current customs and practices; and challenge the hegemonic notions of what is valued, measured and celebrated by policymakers, system leaders and broader communities of interests, that are currently an integral part of our education sectors. He recommends that educational leaders develop their ethical and moral guidance systems, inspired by core values, moral purpose and authentic processes and practices, in order to navigate shifting and dynamic pathways through environments of uncertainty and change. He also recommends that educational leaders at all levels need to act with curiosity in order to carefully examine and analyse the challenging, confronting and disruptive questions that are necessary for the 'flourishing' of school systems and schools now and into an uncertain future. Educators must according to Duignan lead the discourse and ask the important and 'right' questions for this age.

Leaders of schools and education systems will, he claims, need to be more courageous by issuing invitations to collaborate and be potentially vulnerable, to conjointly explore questions to which there is no immediate 'solution' and to be open to broader perspectives. In such circumstances he notes that educational leaders will require dispositions and capabilities to: collaborate across boundaries; create and leverage networks; embrace polarities, paradoxes and tensions; and leverage wisdom and advice from a diverse range of settings and sources. Duignan's book is a compelling read; one that challenges all educators to take action and clearly display a commitment to re-shaping the educational experiences and life chances for all current and future students. His discussions, analyses and recommendations will provide valuable insights for educational policymakers, leaders at system and school levels, leadership researchers and those responsible for leadership training programmes, including leadership professional development, in University settings around the world.

Dr Stephen Brown has a highly successful track record as an Educational Leader at system levels in different state systems in Australia. In 2010, he formed the *Queensland Educational Leadership Institute,* an innovative not-for-profit organisation committed to delivering excellence in leadership by supporting education leaders to establish a strong vision, improve student outcomes and lead change in their school context and wider school communities. In 2016, Dr Brown established the global professional services company, *The Brown Collective* – a company of international experts, specialising in providing customised responses to enhance individual, team and organisational performance. Today, the Collective has an extensive national and international client base and a deep understanding of the challenges that exist within the education and related sectors in their preparations for an unknown and uncertain future.

Acknowledgements

A tribute to a dear friend, colleague and educator *extraordinaire*
The late Dr Paul Brock

Dr Paul Brock was a popular, beloved and much celebrated educator who worked at the University of New England, New South Wales (NSW), Australia, and later for the Department of Education, NSW, before his untimely death due to motor neuron disease in 2016. He was a personal and professional friend. He was noted nationally and internationally for his scholarship and his mission to provide a better education for all young people everywhere, but, especially those disadvantaged and/or being treated unjustly. In the conclusion to his 2011 Australian Council for Educational Leaders' Monograph *Towards Schooling in the 21st Century: 'Back to the Basics' Or 'Forward to Fundamentals?'* he pleaded that future teachers of his two daughters, Sophie and Millie, to abide by three fundamental principles that should underpin teaching and learning in all schools. His passionately felt manifesto for educating young people, especially his two daughters, provides a heart-felt introduction to this book:

> First, nurture and challenge my daughters' intellectual and imaginative capacities way out to horizons unsullied by self-fulfilling minimalist expectations. Don't patronise them with lowest common denominator blancmange masquerading as knowledge and learning; nor crush their love for learning through boring pedagogy.
>
> Don't bludgeon them with mindless 'busy work' and limit the exploration of the world of evolving knowledge merely to the tyranny of repetitively churned-work-recycled worksheets. Ensure that there is legitimate progression of learning from one day, week, month, term and year to the next.
>
> Second, care for Sophie and Millie with humanity and sensitivity, as developing human beings worthy of being taught with genuine respect, enlightened discipline and imaginative flair.
>
> And third, please strive to maximise their potential for later schooling, post-school education training and employment, and for the quality of life itself so that they can contribute to and enjoy the fruits of living within an Australian society that is fair, just, tolerant, honourable, knowledgeable, prosperous and happy.

> When all is said and done, surely this is what every parent and every student should be able to expect of school education: not only as delivered within every public school in NSW, but within every school not only in Australia but throughout the entire world. (Brock, 2011, p. 24)

Thank you, Paul! Your wisdom from the soul constitutes a valued addendum to the arguments presented throughout this book, especially in the final chapter. Your credo represents a refreshing perspective on educational leadership and its possible positive influence on the quality of teaching, learning and learning outcomes, which will be more in tune with and better nuanced, for forming and reforming learning architectures and students' school experiences now and into the future. Throughout the research for and the writing of this book, I held Paul's pleas to educators on behalf of his own children constantly in my mind, and I am grateful to him for inspiring me to persist through the ups and downs of completing this treatise on reforming our educational systems and schools.

Chapter 1

Disruptive Environments with Leadership Challenges and Opportunities

This book focusses on the challenges and opportunities for organisational leaders in contexts of volatility, uncertainty, complexity and ambiguity – known as a VUCA world – and in conditions of exponential change and smart technologies; there is also an emphasis on potential responses by them to these challenges and opportunities. Currently, organisational environments are increasingly characterised by global disruptions and rapid changes that create unprecedented challenges for leaders of complex systems, such as businesses, hospitals and schools. Recent technological transformations have unleashed new disruptive forces that are presenting challenges for educational leaders, especially leaders and teachers in schools. We are living in the most technologically disruptive period ever and the potential for technological connectivity and networking in the future is presently unimaginable. It will be recommended in this book that we will need to change our mindsets and practices in life and in our organisations if we are to cope, never mind thrive, in this brave new world.

Kaplan, in an introduction to a ground-breaking book by Quick and Platt (2015), called *Disrupted: Strategy for Exponential Change,* suggested that:

> […] new technologies relentlessly affect our lives, travelling around the planet at internet speed [and] social media enables people to self-organise and re-organise in ways that weren't possible during the 20th century. (p. 13)

Change and uncertainty, he claimed, surround us and influence us, making one thing crystal clear, '… relevancy is more fleeting than ever' (p. 13); this leaves leaders with the quandary of how to stay relevant in a VUCA world.

The good news for leaders is that the key to relevancy lies in the fact that these fast-changing challenges also contain the seeds for their responses. Leaders have access to the most powerful connectivity capabilities in history, which together with rapidly improving internet speeds and the miniaturisation of connective devices (e.g. smartphones and smart watches), provide them with capabilities they

once couldn't even imagine. Leaders, however, will need to change their leadership theories, mindsets and practices if they wish to remain relevant and successful in a constantly disrupted future.

All leaders, including those in educational systems, need to address the question of relevancy. To simply plan and act only on the basis of current and past conditions will be insufficient. Leadership of organisations in the future will not simply be a matter of: setting goals and objectives based on current conditions and experiences; assigning tasks or roles based on tried-and-true skills and processes; or generating five-year strategic plans and forecasts by focussing on extensions and projections of current and past plans. Instead, they must connect, collaborate and forge strong networks of relationships, within conditions disrupted by changes, risks, constraints and pressures; these conditions, however, are also full of potential and possibilities (Gurvich, 2018). A key argument in this book is that educational leaders in a disrupted future will need to establish clear indicators, even benchmarks, of what constitutes valued and worthwhile leadership approaches and educational practices and outcomes, while all around them the world and their organisations are changing.

Research evidence across a variety of industries (e.g. in business, health and education) and organisations (schools, hospitals and specific businesses), reported on and discussed in this book, indicates that leaders will need to develop their ethical and moral guidance systems inspired by core values, moral purpose and authentic processes and practices, in order to navigate shifting and dynamic pathways through environments of uncertainty and change. However, they will need to reconcile such degrees of clarity in their vision with a VUCA environment by collaborating with others to forge alternate pathways towards reaching the vision and have enough humility to allow for resetting their vision as circumstances dictate. It is important to facilitate and build a shared vision with others in a VUCA world, whereas in the past a single leader often imposed his/her vision on others under the guise of decisiveness and certainty. Caldwell (2019) stated that a vision is still necessary in a VUCA world; this vision, he claimed, should be '… developed collaboratively and embraced throughout the school's community. Vision should excite and unify, going beyond a statement of values and bundling of targets' (p. 14). He cautioned, however, that 'formulating a vision over time is difficult, such is the pace of change in each factor of the environment: physical, demographic, political, economic, technological, cultural [and] regulatory' (pp. 14–15). He concluded that visionary leadership requires '… strategic navigation … especially in times of turbulence and uncertainty' (p. 15).

Further, *visionary* leaders must interpret and action their ethical, moral and authentic ideals within the real world of pressure-filled environments (Cantwell, 2015). In the future, both public and private organisations will be encouraged to strive for higher standards of corporate citizenship and social responsibility and their leaders will be expected to lead using high ethical standards (Pompper, 2018; Stangis & Smith, 2017). In *The Executive's Guide to 21ˢᵗ Century Corporate Citizenship*, Stangis and Smith (2017) pointed out that many business companies have their reputation enhanced when their leaders activate strong corporate citizenship plans and processes, and when they '… see the opportunity to use the assets of

business to solve some of our most pressing environmental, social, and policy processes' (p. xix). They claimed that change management is central to corporate citizenship, because leading change '… is about envisioning a different and better future for business and society' (p. xix). Based on their research, consultancies and executive training with selected leaders worldwide, they recommended that:

- *Leaders stake out a clear vision,* because without a vision people lurch in different directions or run in circles; visions focus minds, hearts and energy;
- *Leaders get the organisational architecture right* when they create structures and processes that provide the space for talent to soar. At a minimum, visionary leaders remove all the roadblocks that people must work around to be successful in their jobs; and
- *Influential leaders call for leadership from every seat* and make it clear that '… everyone should step up and find their spot as leaders, regardless of rank, title, or position'. (p. xxi, italics in original)

While Strangis and Smith are specifically targeting business organisations and their leaders, their advice applies, equally, to educational organisations and school leaders. It is argued throughout this book that school leaders must collectively strive to create authentic schools with clear moral purposes, driven by core values and a passionate commitment to a collective ethic of responsibility that places the wellbeing of all who work there, front and centre. Their schools' values and moral purposes:

> […] should guide and inspire everyone (all key stakeholders) and everything (policies, processes and practices) … to strive for the highest ethical standards in all planning processes and in all practices. (Duignan, 2012, p. 141)

A collective commitment to sharing leadership will not emerge simply from rhetoric or arguments that it is good for us all. Some much deeper motivating force is required and leaders need to nurture school cultures where every stakeholder feels a deep moral and ethical responsibility for the quality of the overall learning agenda and is willing to commit to a collective vision to achieve it. A collective and collaborative view of leadership is strongly promoted in the literature as well as by many influential educational policymakers and practitioners (e.g. Barber, 2011; Caldwell, 2006; Davies, 2006; Hargreaves & Fink, 2006; Sharratt & Fullan, 2009; Walker, 2011). Values and moral purpose in schools must constitute the benchmarks for collective efforts based on what is worthwhile and what is worth doing for students and their parents. Core values are key sources of meaning, purpose and inspiration for every school stakeholder, especially principals, their leadership teams, teachers, students, parents, as well as engaged community members. Such commitment to core values and moral purpose is both aspirational and inspirational.

While there are many challenges for leaders in disruptive environments, there are also numerous positive opportunities for agile leaders so long as they regard

changes not just as disruptions but as '… potentially re-energising and re-organising opportunities' (Johansen, 2017, p. x). Agile, adaptive and flexible leaders are more likely to thrive during times of uncertainty and extreme disruption. Johansen (2017) advised leaders in a VUCA future to suspend, even discard, many of their hard fought-for-assumptions about the way things have been, the way things are and the way things should be, in favour of seeing people and change cycles as having great potential for new creative energies. Danita Bye (2017), in her insightful book *Millennials Matter*, stated that, as future leaders, Millennials will be very successful because: they tend to cultivate a character-driven and courageous core for their lives and their leadership; they are constructive change agents, willing to take responsible risks; and they communicate with confidence and act authentically with their teams. She concluded that a constructive '… balance of character and courage is foundational to their confidence' (p. 27). This is very positive news for education and for schools because Millennials are already taking up educational leadership positions and are emerging as a force for positive, courageous and character-inspired change in the future. In addition, they are not just digital natives; they are naturalised digitals and feel 'as-one' with a digital and artificial intelligence world.

Much is written in relevant leadership literature about ways in which emerging interactive, third-and fourth-wave technologies will impact education and educational leaders in the future. Case (2016), summarised his views on third-wave disruptions for organisations and concluded that the time has now arrived '… when the Internet transforms from something we interact with to something that interacts with everything around us' (p. 5). This will mean that almost everything we do will be enabled by an internet connection [and] '… this process will lead to the transformation of some of the industries that are vital to our daily lives' (pp. 187–188). He predicted that technological transformations will '… reimagine our healthcare system and retool our education system' (p. 5).

In Australia, our National Treasurer, The Hon Josh Frydenberg, in his August 2019 *Sir Zelman Cowan Oration*, suggested that we are living in the age of disruption and '… the world has seen nothing like it. Big data, artificial intelligence and the explosion in connectivity. It is the fourth industrial revolution' (p. 2). He claimed that this revolution is different in both nature and scope from previous ones, because it is:

> […] developing exponentially rather than in a linear fashion. It is less about disseminating information to the wider public, as was the case with the invention of the printing press, but more about algorithms and data as new building blocks to fundamentally change the way we do things across every sector of the economy. (p. 2)

Today, he claimed, we are seeing:

> […] the combined effects of:
>
> - a massive increase in digital data;
> - the growing force of computer power;
> - the ascent of new platforms;

- new organising principles of powerful algorithms;
- the development of advanced analytical tools and techniques; and
- unprecedented ease of connectivity between people. (pp. 3–4)

He stated that:

> […] this perfect storm – decades in the making – has delivered what now seems like the overnight arrival of something that was previously inconceivable: artificial intelligence and machine learning. In simple language, machines are providing insights and recognising patterns by rapidly processing data which allows predictions, and in many cases decisions, to be made. (p. 11)

These developments will have far-reaching implications for all of us and, he concluded that, in an increasingly competitive, globalised and digitised economy:

> […] we need to recognise the unprecedented scope and speed of technological change. It is creating both challenges and opportunities, as it changes every aspect of how we live and how we work. We cannot stop technological change nor should we try to. Rather we need to effectively adapt with a clear sense of what is important to us. (p. 11)

In education, we need to effectively adapt to our disruptions and have a clear sense of what is important. Hargreaves (2009) wrote about *The Fourth Way of Educational Reform* as characterised by '… renewed professionalism and active democracy [which] is defined by inspiration, innovation, social justice and sustainability' (p. 29). He summed up his major views on *The Fourth Way* of educational reform saying that it is resulting in:

> […] less bureaucracy and more democracy; in collaboration more than competition; in innovation and inspiration more than data-driven intervention; in the fear factor giving way to the peer factor as the driver of school reform. (p. 32)

Emerging disruptions and technology-inspired changes and advances require educational leaders and reformers to see old educational landscapes with new eyes – Millennials already possess such visionary views and have growth mindsets to match. Carol Dweck (2016), Professor of Psychology at Stanford University, identified two general types of mindsets – a *fixed mindset* where people believe their personal characteristics and qualities are 'carved in stone' and a *growth mindset*, where they believe that '… the hand you're dealt is just the starting point for development' (p. 7). A growth mindset is based on '… the belief that your basic qualities are things you can cultivate through your efforts, your strategies, and help from others' (p. 7). It is central to any learning paradigm and, consequently, to positive educational change and reform.

There are still numerous obstacles to the reform and possible transformation of educational organisations, including leadership and pedagogical practices. In Gonski, Arcus, Boston, & Review Team Members 2.0 Report on education, *Through Growth to Achievement* (2018), they concluded that 'Australia still has an industrial model of school education that reflects … a 20th century aspiration to deliver mass education to all children' (p. ix). While he was referring to the current state of education and schooling in Australia, it could equally apply in a number of other countries discussed in this book.

In her research into the progress of educational reform in the USA, Wilson (2018) came to a similar conclusion as Gonski, but offered a more positive perspective when she explained that while existing traditional industrial-era schools will be difficult to change they can be transformed into more '… flexible learning environment[s] that prepare our children for an unknown future' (p. 45). If education reform in schools is to respond positively to Wilson's view for the future then educational policymakers and leaders, including teachers, will need to find new and creative ways and means of encouraging the types of changes that will bring about changed mindsets – a paradigm shift – about the nature of learning, teaching as a process and a profession, the architecture of schools and schooling, as well as the nature of technologies that will complement and support all of these. Smart technologies and emerging educational innovations, including the physical and pedagogical architecture of schools, are changing educational systems and institutions and they will have considerable consequences for the nature and delivery of education in the future.

The good news is that over the past couple of decades, there is a growing movement to reinvent the architecture of education, especially at school level, to better reflect: changing views of learning environments; space and time configuration; the nature of pedagogical approaches and processes; and the dynamics for collective responsibility of quality learning and leadership in educational systems and schools. There are signs from a number of countries that the long-time emphasis on testing and accountability is being slowly modified by one that focusses more on students and the quality of their learning, teachers as leaders of curriculum and pedagogy and principals and leadership teams as leaders of learning (Bentley, 2008). In an important early contribution to this emerging perspective, an OECD (2008) report, titled *Innovating to learn, learning to innovate*, seemed to despair of the educational reform movements to that date and concluded that:

> […] *reforms have ultimately come up against a wall, or rather a ceiling, beyond which further progress seems impossible, leading increasing numbers of school administrators and educators to wonder whether schools do not need to be reformed but to be reinvented.* (p. 22, italics in original)

A decade later, Schleicher (2018) pointed the way towards successful educational reinvention when he reported that:

> […] schools now need to prepare students for more rapid change than ever before, to learn for jobs that have not yet been created,

to tackle societal challenges that we can't yet imagine, and to use technologies that have not yet been invented. (p. 29)

In schools, he claimed, the

[…] more interdependent the world becomes, the more we need great collaborators and orchestrators [who] need to become better at helping students learn to develop an awareness of the pluralism of modern life. (p. 31)

Wilson (2018) has hope for a brighter future for education as a result of her comprehensive research project on reform in schools across the USA. She observed teams of teachers, school leaders, students, parents and whole communities collaboratively and creatively attempting to transform educational learning environments and experiences for their students. Ironically, however, she reminded us that while '… the core of change is learning, … our institutions of learning are slow, some might even say immune, to change' (p. 1). She based her argument on the view that educational change is, essentially, a developmental task and, when we ask schools to change, we are asking human beings to change; '… this requires special tools and a human-centred approach' (p. 4). This human development approach, she claimed, requires that educational reformers '… rethink, reimagine, and redesign a school to unleash potential, spark curiosity, and invite learners to think for themselves and to take ownership of their learning' (p. 3). This view on human-centred education is central to arguments for transformational reform of education in this book, but it is acknowledged that we will require many well-intentioned, creative and energetic reformers '… to build new skills and an ongoing capacity for change and adaptation' (p. 5).

It is also recognised and accepted throughout this book that the data organisations currently have on performance outcomes provide opportunities to boost reform agendas and performance improvement. However, a downside to data-driven improvement processes is the potential devaluing of the qualitative judgments of teachers and professionals in educational systems and schools. Muller (2018), in *The Tyranny of Metrics*, cautioned about the possible consequences of a contemporary obsession with comprehensive assessment regimes, data use and metrics, generally. He stated that there are '… unintended negative consequences of trying to substitute standardised measures of performance for personal and professional judgment based on experience'. Drawing from his extensive research on the usefulness or otherwise of metrics for improving performance in organisations, he claimed that '… while they [metrics] are a potentially valuable tool, the virtues of accountability metrics have been oversold, and their costs are often not appreciated' (p. 6). His book is an important source of knowledge and insights for educators and educational leaders on how to achieve a more productive and rewarding balance between people-based (human character and qualities) and evidence-based (measurement and data) approaches to professional judgements and decision making in education.

Following his review of different countries' educational systems, Schleicher (2018), similarly, recommended a wise balance between the use of metrics and

a greater reliance on the professional judgements of educators, especially teachers. He claimed that there is wide diversity in actual accountability processes and that '… approaches to accountability evolve as school systems themselves evolve – as rules become guidelines and good practice and, ultimately, as good practice becomes culture …'. This progression, he claimed, involves:…a shift in the balance between 'administrative accountability' and 'professional accountability' (p. 115) and concluded that this shift will be assisted by the use of smart technologies* and leaders who have a more expansive and broader views of reform drivers in education. (* For more on how technology will transform the work of human experts, see Susskind & Susskind, 2015).

Emerging leadership literature appears to conclude that educational leaders and reformers need to look beyond their own systems and schools to gain information and inspiration from a VUCA environment. The Gonski et al.'s 2.0 Report (2018) recommended that educational change leaders need to focus on and use forces outside their schools to assist in their reform initiatives. An OECD (2017) international report on innovation in schools concluded that too few innovations in education '… have looked at the broader context and the external relations of schools as drivers of innovation' (p. 3). The authors of the report argued that '… we need to see schools as networking institutions and part of encompassing ecosystems of learning and innovation' (p. 3). Teachers, they recommended, need to be partners in implementing this educational ecosystem because they should be '… participants, co-authors, co-designers, co-implementers and co-leaders of the process' (p. 116).

While smart technologies will greatly assist leaders in their reform initiatives, the authors of an OECD (2016) report on the use of technologies in education, cautioned that introducing digital technology into education for technology's sake '… does not materially improve results because educational reforms need to place teaching practice rather than technology in the driving seat' (p. 89). The authors claimed that many recent reform attempts have used the 'wrong drivers' of reform because, as Fullan (2011) concluded, '… they do not lead to culture change' (p. 5). The 'right drivers' to achieve educational reform, according to the OECD (2016) report, should focus on:

> […] the teaching-assessment nexus, social capital to build the profession, pedagogy matching technology, and developing system synergies [because these drivers] work directly on changing the culture of teaching and learning [and they] embed both ownership and engagement in reforms for students and teachers. (p. 90)

They pointed out that the real effectiveness of technology in teaching and learning environments comes from the effectiveness of the pedagogy that it supports.

A challenge for most educational reformers is to determine the ways and means to constructively drive educational change and reform in a VUCA world. The conclusions of Prince, Swanson, and King (2018) – authors of a 10-year forecast for education, called *KnowledgeWorks Forecast 5.0* – helped provide answers for this challenge. They concluded that while numerous drivers and changes have