

Beyond Certainty:

A Process for Thinking About
Futures for Australian Education

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FOREWORD

Australian public secondary schools serve a pivotal role in our communities across the nation. They enrich the lives of children and young people by helping them to reach their potential, play an active role in civic life and contribute to the economy through work.

Understanding that we are leading our school communities at a time of rapid change and in a world of increasing complexity, the Australian Secondary Principals' Association (ASPA) commissioned Professor Alan Reid to write a monograph to help us navigate our way through these contemporary challenges. Our interest was in having him provide a resource that will help to spark educational debate and discussion about contemporary policy and practice; propose some ways forward; and provide a reference point for ASPA's future decision making.

Professor Reid has delivered a document that is rich in ideas. It challenges the certainties of current policy and practice by pointing out that educational decision making is always context specific. Using this understanding as his starting point, Alan proposes a six-step process through which the profession can consider key societal trends and their educational implications, from the perspective of the purposes of education.

From this process, many new and exciting ideas emerge about curriculum, pedagogy, and school and system-wide change. Importantly, the monograph does not suggest that we start again. Rather, it proposes some ways to refine our current curriculum work, and to overcome some of the blockages. In so doing, it provides a common language with which to discuss our work.

Importantly, the monograph affirms to the community all those aspects of public education that contribute to enhancing the learning outcomes of the children and young people, and to building the common good.

The ASPA Board thanks Professor Reid for his work on this significant document. We believe that it will encourage discussion and debate across the educational landscape as together we grapple with the important question of how to maintain, enhance and promote the quality of our wonderful public education systems.

It is in that spirit that I commend this monograph to you.



Andrew Pierpoint
President

Australian Secondary Principals' Association.

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EXECUTIVE SUMMARY

What's the problem?

From the many voices contributing to debates about policy and practice in Australian education, it is possible to identify two major competing discourses. One is standardising, and favours certainty, uniformity, competition and regulation in education policy. Its policy features include school choice, competition between schools in an education market, high-stakes standardised testing and narrowing the curriculum. The other discourse is futures-focused and prizes flexibility, adaptability, collaboration and agility. Its policy features include student-centred teaching approaches, integrated and project-based learning, inquiry, formative assessment and teacher autonomy.

It is clear that the standardisation discourse is holding the upper hand, and has become instantiated in the framing of education policy in many countries, including Australia. This is despite the fact that in many countries, teachers and educational researchers have demonstrated its negative consequences. They argue that such approaches actually diminish the quality of education, fail to address the challenges of the future, and make it harder for educators to implement a futures-focused agenda.

Not only is such evidence ignored in the public arena, but many media commentators advocate for a hardening of standardising approaches. Politicians and bureaucrats listen to these powerful voices, dismiss futures-focused alternatives, and retreat to the safety of the past.

So why is the standardised approach so dominant? Why is it that the challenges of the 21st century are being met by educational policy that is designed for the certainties of the 20th century? Why have policymakers not been convinced by the many reports and academic papers that argue the need for a futures-focused agenda? In this paper I examine these questions by looking at the literature and various reports that explore the future in Australian education, and conclude that they have not influenced policy because they contain three fundamental flaws.

First, they fail to articulate the purposes of education in contemporary times. Without a detailed declaration of purposes, there is no reference point against which to assess the adequacy of the approaches they suggest. Second, they rarely explore in any depth the social, political, economic and environmental changes, and their implications, that provide the rationale for the strategies that are proposed. And third, they ignore the blockages to any change proposal, particularly those presented by a dominant policy climate based on standardising, certainty and regulation. I argue that a new way must be found to address these omissions and move the debate forward.

What can be done? Towards a process for thinking about futures for Australian education

The basic premise of this paper is that the future is not inevitable: it is fashioned by humans who can either allow events and trends to wash over them and then respond to the effects, or be proactive and try to shape the outcomes. With a commitment to the latter course of action, I suggest that the best way to plan for the future in education is to use a process that allows educators and policymakers, in an ongoing way, to understand, monitor, evaluate and assess broad societal trends and the changes they are bringing.

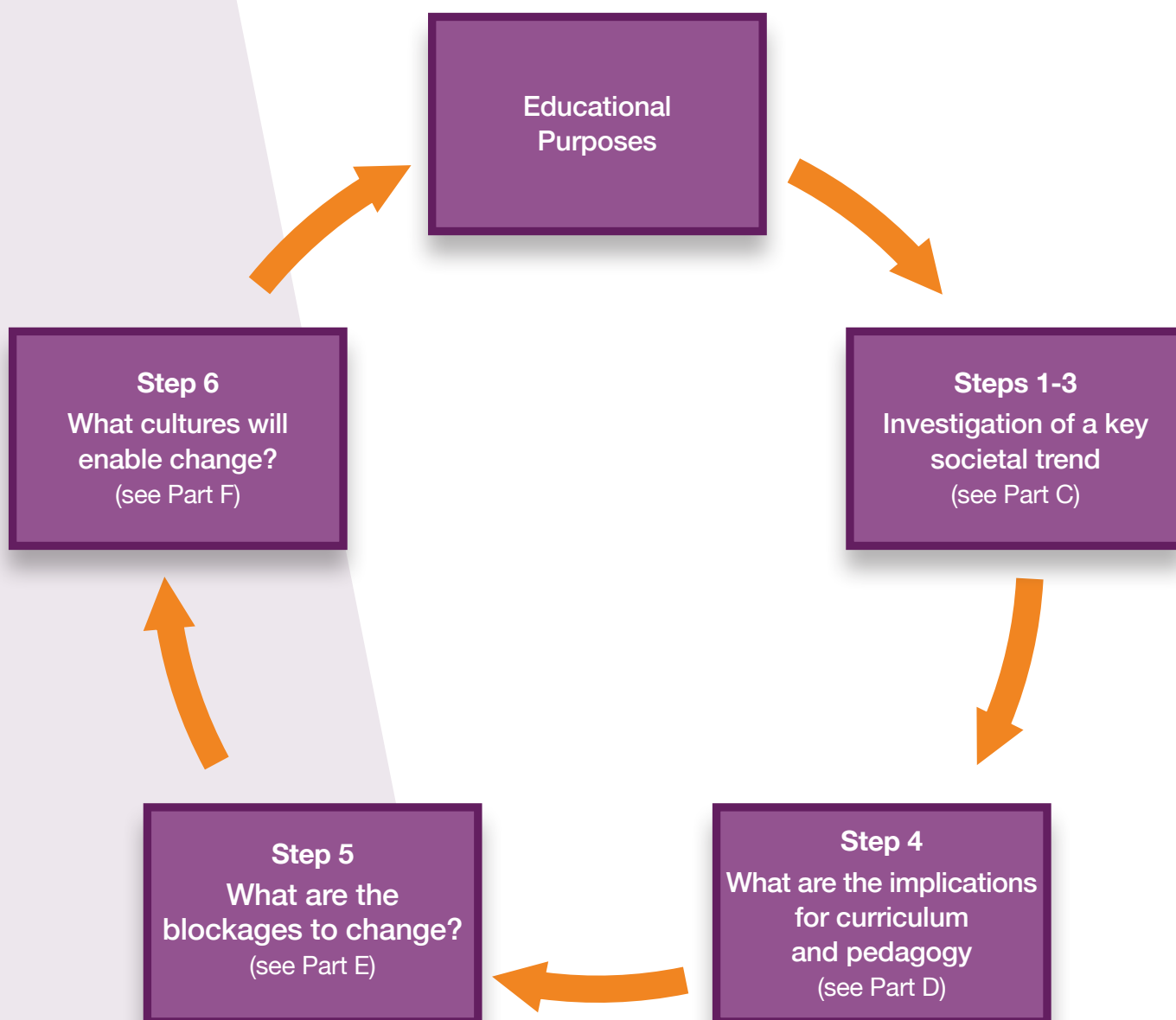
Such a process is more likely to break the stranglehold of standardising approaches to education policy by providing the evidence needed to substantiate policies and practices that are better suited to the changing environment of the 21st century.

In this paper, I propose a six-step process to address each of the weaknesses common to current approaches. Thus the process assumes an understanding of, and agreement about, the purposes of education and returns to these at appropriate intervals; involves an in-depth investigation of key societal issues and their educational implications; and takes account of the blockages to suggested changes.

Diagram 1 describes the steps of the process. It starts with the selection of a key societal issue or trend to investigate. The first three steps explore the nature of the trend and its impact on the arenas served by the purposes of education – work and the economy, democracy, individuals, and social and cultural life. From this process emerge some implications for the capacities (knowledge, skills and dispositions) that people need to live productively with, and to shape, the identified changes. The second three steps of the process focus on education. Thus Step 4 looks at the implications of the trend for curriculum and pedagogy; Step 5 examines the blockages to any curriculum change suggested; and Step 6 investigates the cultures that are compatible with the suggested changes.

This process is used to inform an analysis of possible futures for Australian education, and to arrive at recommendations for the Australian Secondary Principals' Association. However, given that it has a wide scope and sweep – it spans the official curriculum, approaches to teaching and assessment, accountability and cultural factors – the process could also be used at system-wide levels, and in schools, for assessing current policy and practices, and thinking about educational futures.

Diagram 1: A process for thinking about futures for Australian education



Using the process to explore a key societal trend for guidance about education and the future

For the purposes of this paper, I selected the third/fourth industrial revolution as an example of a broad societal trend. At the heart of this trend is digitalisation, the impact of which is being realised through such disparate technologies as personal computers, mobile phones, social media, data storage, renewable energy technology, robotics, artificial intelligence, 3D printing, nanotechnology, gene editing, GPS tracking, autonomous vehicles and so on. These technologies are changing entire systems of work, governance and production in our society. More recent developments such as quantum computing, and the blurring of the lines between physical, digital and biological spheres, have caused some to suggest that we are moving from the third industrial revolution to a fourth industrial revolution. For this reason, the term used in the case study is the *third/fourth industrial revolution*.

The outcomes of the third/fourth industrial revolution are not predestined: it will be the response of humans that will determine what happens – and education is one of the central elements of such a response if we are to shape, rather than be shaped by, these developments. The key purpose of the case study is to identify the capacities people need to navigate the challenges thrown up by the third/fourth industrial revolution, and it is on the basis of this information that the paper examines the educational implications. Thus, the first three steps of the case study (elaborated in Part C) examine the nature and impact of the third/fourth industrial revolution from three arenas served by the purposes of education.

- *Work and the economy*: the paper explores the impact of digitalisation and artificial intelligence on the extent, nature and conditions of work in the future, and the kinds of capacities people require to handle such change.
- *Democracy*: the paper explores the effects on elections, political discourse, the quality of information in the public sphere, meta-data and surveillance, and what these mean for the kind of capacities people need to sustain a healthy democracy.
- *Individual, social and cultural life*: the paper explores the impact of digitalisation on individual privacy, social interactions through social media, the effect on human instincts of an increased reliance on algorithms, social disruption caused by economic change, and what these mean for the capacities needed by individuals for personal development, and for social and cultural life.

When the capacities identified in each of these arenas are aggregated, they confirm that in the 21st century, our society needs people who are able to learn both independently and collaboratively; who are open-minded, creative, discerning and critical thinkers with the ability to transfer knowledge and apply their skills to different contexts; who understand the processes of learning and the strengths or weaknesses they bring to them; and who have a disposition for the common good.

How does our society assist people to develop such skills, understandings and dispositions? It is only in educational institutions like schools where these capacities can be taught in a systematic way by people with expertise in the relevant content areas and in the best ways to teach and assess learning. Thus, Steps 4–6 of the process deal with the educational implications of the case study (elaborated in Part D). They reveal the basis of an educational agenda for the future.

What might curriculum and pedagogy for the future look like?

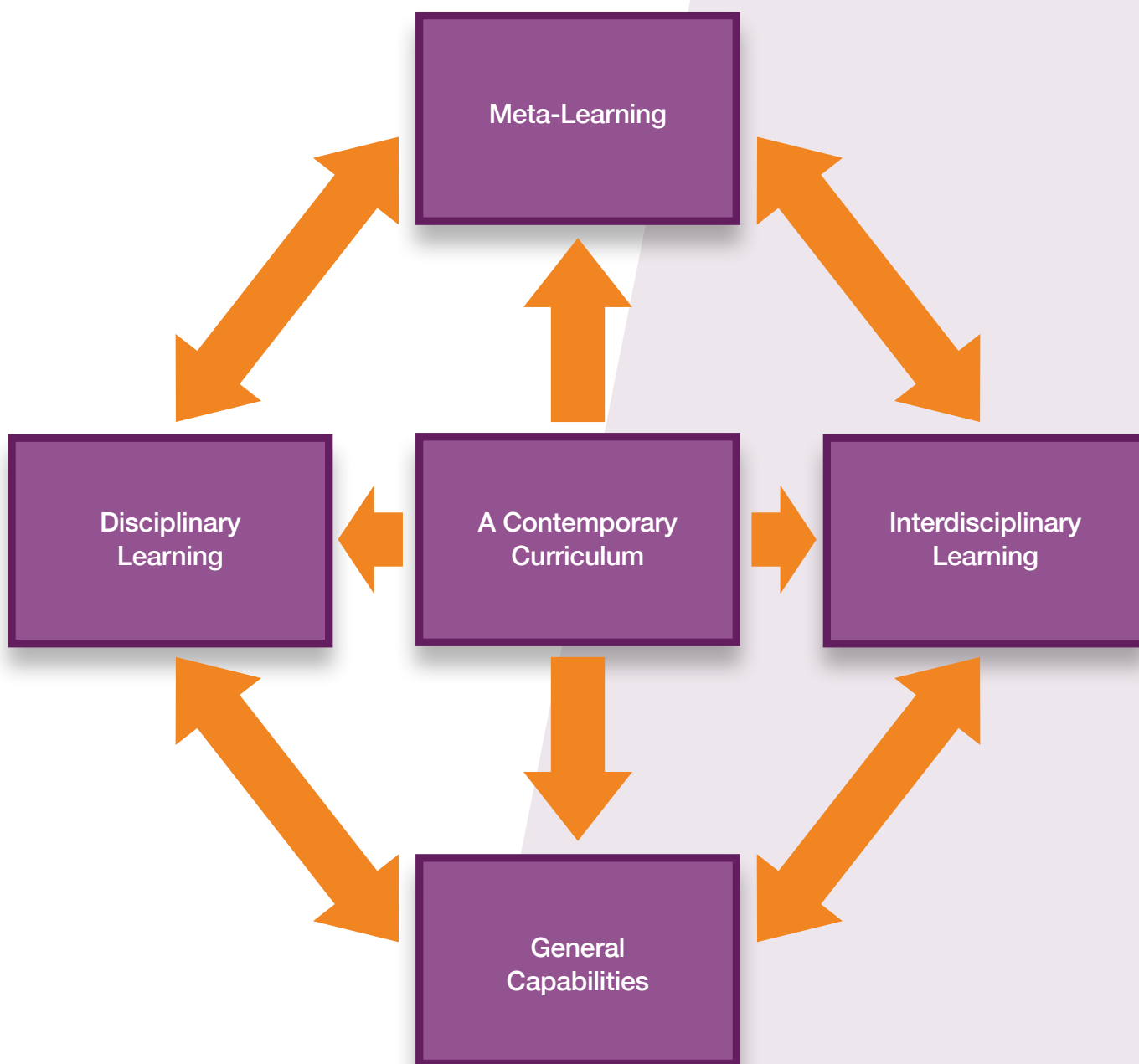
In Part D, the paper describes the implications for two key aspects of formal schooling – what is taught (the official curriculum) and how it is taught and assessed (pedagogy) – that emerged from the case study.

The official curriculum

When the capacities identified in the case study are placed side by side, it is possible to group them under four different kinds of interrelated knowledge categories that are integral to an official curriculum for the 21st century. Importantly, the four components cannot be seen or developed in isolation – the deep essence of each can only be fully realised when it is in a dynamic relationship with the other components. Diagram 2 tries to capture the synergy derived from this interrelatedness.

- *Disciplinary learning:* Disciplines are the foundation blocks of knowledge in our society, and are therefore central to learning. The other three curriculum components enrich the curriculum by working in and through the disciplines.
- *Interdisciplinary/multidisciplinary/transdisciplinary learning:* Increasingly, new knowledge is generated through the synthesis of knowledge from different specialised disciplinary fields. Thus, ways of understanding and dealing with societal issues and problems can only be achieved if the fundamental unity of knowledge is appreciated, and people are able to work across disciplinary boundaries. The capacity to combine disciplines (interdisciplinary), or draw from a number of disciplines (multidisciplinary), or blend disciplinary knowledge (transdisciplinary) is, therefore, a fundamental capacity in the 21st century. Interdisciplinary knowledge has a symbiotic relationship with disciplinary knowledge.
- *General capabilities:* There are a number of key skills, values and dispositions without which people could not function adequately in our society. In the Australian Curriculum these have been called general capabilities. They are keys to the enactment of disciplinary and interdisciplinary study, and to individual and social practice.
- *Meta-learning:* Meta-learning is the capacity to understand oneself as a learner and the process of learning. It goes beyond metacognition, taking in new understandings about learning in fields as disparate as neuroscience and the functioning of the brain, emotional, sensory and social learning, cognitive psychology, and learning and physical movement. Learning about learning is fundamental in an information/knowledge society where knowledge is expanding at an exponential rate. If learning is a key to living in the 21st century, then understanding the many aspects of learning is crucial. In curriculum terms, meta-learning involves deep reflections on learning as students work with disciplinary, interdisciplinary and capability-based knowledges.

Diagram 2: The dynamic relationship between key components of the contemporary official curriculum



These four components already exist – to a greater or lesser extent – in the Australian Curriculum, and various state/territory-based curricula. Thus, it doesn't suggest a new curriculum agenda, but rather changes or modifications to what currently exists. This paper explores such changes, including an ongoing review of disciplinary learning as represented in the learning areas; better support for interdisciplinary learning through the official curriculum and resources; identifying the reasons that the general capabilities are still marginal in curriculum work; and expanding metacognition (currently named as one part of one capability) to include recent knowledge about learning from a range of fields, and creating meta-learning as a separate but closely connected curriculum component.

Pedagogy

The sorts of learning outcomes suggested by the case study have implications for the pedagogy of the 21st century. The paper argues that pedagogies of the future hinge on the development of a framework for teaching – a kind of teaching toolkit – which enables teachers to use their professional knowledge by selecting approaches appropriate to the students in their care, the topic or program, and the context. Such a framework should not be imposed or set in stone, but refined and improved through practice, research and professional conversations.

In this way, teachers are seen as curriculum and learning designers, rather than technicians implementing an imposed and tightly controlled curriculum. Such an approach would highlight the impoverished thinking of those media commentators and policymakers who insist that there is just one best teaching approach; or assert that there is a set of variables that promote best practice no matter the context or situation.

I suggest a possible framework, discussed in Part D, which contains a number of elements on a continuum from which teachers select, such as learning orientations, models and strategies of teaching, assessment approaches, and classroom organisation. The idea is that teachers will move across the continuum, piecing together an approach to teaching a particular aspect of the official curriculum, such as a concept, theme or topic, for a particular group of students. The framework is based upon a set of teaching principles, and values and practices for establishing and nurturing a classroom environment, which are consistent with what emerged from the case study.

It is important to note that the framework is not exhaustive or complete, it is illustrative only of the possibilities for theoretically sound, practical and flexible pedagogical guidelines that could form the basis of an ongoing professional conversation. Crucially, it demonstrates the serious limitations of the current debates about teaching quality and standards, that appear to assume that decisions about pedagogy are an either/or proposition.

What is needed to introduce the kinds of curriculum and pedagogical changes suggested?

Many proposals for curriculum and pedagogical change don't take account of the environment into which they are introduced. Thus, if there are policies and practices, such as those suggested in Part D, that are inconsistent with curriculum changes, it is unlikely that the change will result in the outcomes planned until the blockages are identified and removed. Conversely, the changes are more likely to be introduced successfully if there is an environment that is consistent with, and conducive to, the changes. This paper deals with both these scenarios.

Blockages to change

Obstacles to change can be present within the focus of the change itself (in this case the intended curriculum and pedagogy), and by the established practices and cultures into which they are introduced. Some obstacles are obvious, others can be difficult to detect because they have become so much a part of the dominant grammars of an organisation, embedded in its culture and taken-for-granted practices. They can be present in classrooms, schools and education systems as a whole.

In this paper, I address both sorts of blockages. In Part D, I look at some long-held curriculum beliefs and pedagogical practices that are incompatible with the changes proposed. These include such matters as the belief that rigour is only equated with disciplinary learning, the predilection for teaching packages that provide the answer, and the insistence that teaching involves a single choice between teacher-centred explicit instruction or student-centred inquiry. Until such misunderstandings are consigned to the past, a futures-focused curriculum and pedagogy will always struggle to take root.

The paper also addresses the systemic practices and cultures that are incompatible with the curriculum and pedagogical changes proposed, not least because they serve to perpetuate the myth of certainty. At a time when – as the case study demonstrates – humans are facing significant challenges and exponential change, the dominant official educational response has been to resort to the safety of standardised testing, education markets, league

tables and scripted teaching. Unless such policies are challenged, they will mould any introduced curriculum change in their likeness.

At the heart of this regime of certainty is an obsession with data, often manifested and justified under the banner of evidence-based policy. Data makes an important contribution to any education system wanting to track progress and review programs; however, when narrow forms of data are used to make snap judgements about quality, ignoring the range of factors that contribute to educational outcomes, and narrowing the focus of what is important, then it works against quality.

In Part E, I use the Programme for International Student Assessment (PISA) as an example of an instrument that purports to precisely calibrate and measure educational outcomes, but which only ends up distorting, narrowing and standardising education. Given what is now known about assessment and evaluation in education, it is surely possible to develop more enlightened approaches to assessing education outcomes – both in Australia and internationally – than conducting standardised tests in a small range of subjects.

Cultures that sustain and promote change

It is not enough to just remove the impediments to change. If the change is to occur in more than name only, then there must also be a set of supporting conditions. The most important element of the supporting conditions is consistency between the changes and the culture into which they are introduced. This means ensuring that the values and practices of schools and the system do not exude characteristics incompatible with the change. Even the most dynamic change ideas will founder on the rock of an incompatible culture. In Part F, the paper explores two important aspects of culture needed for the curriculum and pedagogical changes suggested.

A culture of research and inquiry

The case study shows that since many of the issues facing educators today are context-bound, they are not amenable to universal solutions. That is, educators face the considerable challenge of designing curricula for local contexts that are flexible enough to address the rapid growth of knowledge, and that recognise the increasing religious, cultural and ethnic diversity in their student populations. In the 21st century, therefore, educators need to be inquirers into educational practice who can question their routine practices and assumptions, and who are capable of individually and collaboratively investigating the effects of their teaching on student learning. From this perspective, educators are people who learn from teaching, rather than people who have finished learning how to teach. A culture of research and inquiry requires education systems to shift away from the dominant managerial model of top-down educational change, to one that uses the knowledge created by teacher- and student-led inquiry in schools as an important ingredient in the policy mix.

A culture that promotes and sustains the characteristics of public education

One of the key insights emerging from the case study on the third/fourth industrial revolution is that all citizens should possess the understandings, skills and dispositions to promote the common good in our society. That is, so many of the challenges today demand that people have a commitment to the collective good, rather than a sole interest in what will benefit the individual. There are at least two key aspects to consider. The first is to create and maintain a system of education that itself models a commitment to the common good.

This includes ensuring that education is available free to all on a comparatively equal playing field and on a non-exclusionary basis, and has policy and practices consistent with, and promoting of, the common good in education.

The second aspect relates to the role of education for the common good. This involves schools developing the skills, dispositions and understandings of children and young people, such that they can engage – respectfully and thoughtfully – with others in deliberation about the common good in the broader society. The paper explores a number of characteristics that promote the common good and that are embedded in the essence of public education – equity, diversity and cohesion, trust and collaboration, democracy, and so on – and that need to be sustained and promoted by systems and schools. Policies designed to make public schools behave as though they are private are counterproductive because they are destroying the very qualities and characteristics needed for education systems to meet the challenges of the future.

Reflections on the process and on school leadership

The paper concludes by reflecting on the problems and possibilities evoked by the model that was used as the vehicle for understanding the curriculum and pedagogical changes suitable for the 21st century. It also considers the kind of educational leadership needed to introduce such an agenda in schools and systems, focusing particularly on the political skills and understandings required in a highly charged political environment.

The development and practice of the approaches suggested in this paper cannot be achieved without collegial and resource support. This makes the role of professional bodies like the Australian Secondary Principals' Association crucial to the success of the kind of educational program that is recommended, and thus to Australia's educational futures.

“Why is it that the challenges of the 21st century are being met by educational approaches designed for the certainties of the 20th century?”

INTRODUCTION:

Why a paper on education and the future?

The education debate in Australia is based on a strange dichotomy. The dominant side of the debate has a standardisation focus. It is represented by what has been described as the Global Education Reform Movement (GERM), which has a number of standardising features including school choice, competition between schools in an education market, high-stakes testing regimes that drive public accountability, narrowing the range of subjects and how they are taught, and publicly naming and shaming schools to drive improvement (Sahlberg, 2012, 2015). Many countries around the world, including Australia, have fallen prey to the GERM infection, as governments use the data provided by powerful international groups such as the Organisation for Economic Co-operation and Development (OECD) and the World Bank as the centrepiece of evidence-based policy, and contract private multinational corporations and consultancy companies like Pearson and McKinsey, to develop educational strategies.

Running in parallel to standardisation is a less prominent side of the education debate that has a futures focus. It is based on the premise that the rapidity and extent of change in the contemporary world demands a new approach to education that is often represented in reports as '21st century learning' (e.g. Bellenca & Brandt, 2010; Scott, 2015; Trilling & Fadel, 2009). These reports cite accelerating globalisation and exponential growth in new technologies as factors that have spawned a number of specific economic, social, political and environmental developments, including digital technologies such as artificial intelligence (AI), machine learning, robotics and bio-technologies; climate change and resource depletion; meta-data; diversity, migration and urbanisation; and more. They argue that such changes demand a significant rethink of traditional approaches to education. These include student-centred teaching approaches, integrated and project-based learning, inquiry, more flexible student groupings and so on.

The differences between the standardisation and the futures approaches are stark. The former favours uniformity, competition, regulation and conformity in education policy. The latter prizes flexibility, adaptability, collaboration and agility. Of course in practice these appear more as differences in emphasis, rather than as blunt antonyms; and sometimes both approaches are touted by the same people or groups. For example, the Programme for International Student Assessment (PISA) – a standardised test in the vanguard of the GERM, and the reason for the implementation of many of the standardised approaches around the world – is owned and controlled by the OECD. And yet the OECD also promulgates reports that have a futures focus and propose approaches at odds with standardisation (e.g. OECD, 2018).

Notwithstanding, it is clear that the standardisation focus is holding the upper hand, and has become instantiated in the framing of education policy in many countries, including Australia. This is despite the fact that in many countries teachers and educational researchers have demonstrated its negative consequences, arguing that such approaches actually diminish the quality of education, and fail to address the challenges of the future (e.g. Apple, 2013; Ball, 2008; Ravitch, 2016; Reid, 2013a; Rizvi & Lingard, 2010; Thrupp, 2018). Not only is such evidence ignored in the public arena, but many media commentators decry the supposed decline in educational standards in Australia and advocate for a hardening of GERM approaches. Politicians and bureaucrats listen to these powerful voices, dismiss futures-focused alternatives, and retreat to the safety of the past.

Why is the standardised approach so dominant? Why is it that the challenges of the 21st century certainties of the 20th century? In this paper, rather than provide yet another critique of the GERM approaches, I want to address what I believe is the reason that the futures focus hasn't had much traction with policymakers. In my view the Achilles heel of the futures focus has been that its proponents rarely explore in any depth the social, political, economic and environmental changes, and their implications, that are the basis of the strategies they propose for the future.

Certainly there are many proposals describing what schools and systems should do to meet the challenges of the new environment, but rarely is a closely argued connection made between the nature of contemporary change and the education policies designed to meet them. The recent national report on Australia's schooling system, commonly referred to as the Gonski 2.0 report, is a classic of this genre (Gonski et al., 2018). Despite claiming that its 23 recommendations will help to shake schools free from the 20th century 'industrial model of school education' (Gonski et al., p. ix) upon which it claims the Australian education system is based, the report ignores the key current and future societal challenges that its recommendations are designed to meet. Listing a set of 21st century learning skills, accompanied by proposals for pedagogical change, is not enough to disrupt the dominance of the standardised focus without exploring in depth where these come from. It constitutes little more than guesswork.

In this paper I attempt to address this weakness and move the debate forward. It is based on the view that the future is not inevitable: it is fashioned by humans who can either allow events and trends to wash over them and then respond to the effects, or be proactive and try to shape the outcomes. With a commitment to the latter course of action, the paper suggests that the best way to plan for the future in education is to use a process which allows educators and policymakers, in an ongoing way, to understand, monitor, evaluate and assess broad societal trends and the changes they are bringing. It is only when that is achieved that it is possible to identify the kinds of educational approaches that are best suited to meeting the challenges of the future.

A process-based approach recognises that, as the central actors facilitating the learning of young people in our schools, it is educators – not just politicians, consultants, bureaucrats or media commentators – who must be involved as key participants. However, since the involvement of educators in policy development has been marginalised in recent times, there is no obvious process to follow. This paper enters into uncharted territory by proposing such a process, and then modelling it through a case study of a broad social and economic trend; the third/fourth industrial revolution.

In summary, I am suggesting that instead of discussing the future by engaging in predictions or exploratory forecasts, the way forward is to establish a process educators can use in an ongoing way to grapple with current trends, before exploring their educational implications. Such an approach will have at least two powerful effects. First, it will break the stranglehold of the standardising approach to education policy by providing the evidence needed to substantiate policies and practices better suited to the changing environment of the 21st century. In other words it will illuminate the manifold weaknesses of approaches drawn from the GERM. Second, since the process prizes the professional knowledge and expertise of educators, it suggests a way by which educators can re-enter the policy debates from which they have been so egregiously excluded.

Arriving at a suitable process demands some preparatory work that explores the current educational debates and which identifies its missing elements. It is to that task I turn in Part A.

How are educational futures thought about today?

Before proposing a process that can be used to facilitate educational planning, I will explore the ways in which the educational literature analyses what education might look like in the future. Such a review will help to inform the kind of process developed, and in particular identify what aspects are missing from current educational policy.

Although considerations about the future are often present more by implication than by design, I have identified some of the major emphases and organised these into four categories – the four Rs. The title of each category seeks to encapsulate a different philosophy about, and approach to, education in the future: revert, reboot, reframe, and replace. Each approach has a distinctive core that distinguishes it from the other categories and which connects the disparate ideas contained within it. The four categories are a heuristic to help clarify the major contesting ideas at the start of the paper, and so in this section, I will describe rather than analyse these ideas. However, I will return to the four Rs later to more critically assess their suitability for meeting the challenges of the future.

Revert

At its core, this approach sees desired educational futures as involving a reversion to the key features of the past. It is exemplified by the Australian commentator Kevin Donnelly who, for the past two decades, has argued that the tried and true practices of the past have been undermined by trendy fads engineered by the cultural left, which have lowered standards and reduced rigour. For him, the future lies with a return to the established educational traditions, which include teacher-directed teaching, strict discipline, an emphasis on the canons of literature and the Judeo-Christian heritage and tradition, rote learning, competition and choice (Donnelly, 2012, 2018a, b & c).

A similar stance is taken by the English educator Daisy Christodoulou (2014) whose book *Seven myths about education* has had a significant influence on the debate in England. She argues that too many students in England leave school without basic literacy and numeracy skills, and suggests the fault lies with a number of myths that dominate contemporary education. In her book, Christodoulou describes and critiques seven of these myths, and concludes by arguing their reverse. This leaves her with an educational agenda for the future based on traditional educational approaches. These include reifying teacher-led instruction, and moving away from the idea of learning as doing and student engagement in projects and activities.

Another more scholarly perspective within this approach is represented in the work of Michael Young (2008, 2014). His concerns are that current curricula are marginalising powerful disciplinary knowledge. Young points to attempts to cater for the interests and motivation of non-academic students who, from the 1970s onwards, were staying at school for longer periods in increasing numbers, as the start of a trend to diminish the knowledge base of the curriculum. This resulted in the introduction of programs oriented to everyday contexts, such as work-related and community-oriented activities, which, he says, make it difficult for students to use disciplinary-based knowledge independently of its context. Young claims that the current focus on competencies and integrated teaching have confirmed these trends, which are short-changing young people.

Young stresses the important role of schools as institutions involved in the transmission of knowledge from one generation to the next. He maintains that this role has been weakened, as the focus has shifted to learning and educators have stopped talking about what students should know. Rejecting the idea that the official curriculum represents the 'knowledge of the powerful', Young proposes instead the notion of 'powerful knowledge' which should be available to all. Powerful knowledge draws on the work of communities of specialists and is organised through disciplines. Educators use their knowledge of how students learn to recontextualise disciplinary knowledge as school subjects.

Although there are real differences in the ideas described here, the common element in the revert category is the argument that, far from rejecting what has been valued in the past, the pathway to the future in education should involve returning to key practices of the past, in particular the discipline-based curriculum. The existence of schools as institutions – as well as their structures, processes and organisation – are either not questioned or are reaffirmed. The major focus is on curriculum and pedagogy, with an emphasis on the acquisition of knowledge to which many children and young people would not have access at home or in their communities if schools did not exist.

Reboot

In essence, this approach assumes that the ways things are organised now in education – the curriculum, pedagogy and school structures – are adequate to meet the needs of the future, but that the future consists of improving the quality of education by focusing on what works best. It is exemplified by Professor John Hattie, whose work is based on synthesising over 800 meta-analyses of the factors that have the most impact on student learning. In his well-known book *Visible learning*, Hattie (2009) calculates the effect size of 138 influences on educational outcomes and places them in rank order. He argues that teachers and education systems should focus on those variables with an effect size of $d = 0.4$ or greater. Thus, variables located at or above this designated hinge-point exert the greatest influence, whilst those variables below it are a distraction.

Visible learning has become an international best seller in education, and was hailed by the *Times Educational Supplement* as teaching's Holy Grail. Professor Hattie has become something of an international educational guru (Eacott, 2017), and although his work has attracted some sustained critique for its methodological flaws (e.g. Beregron & Rivard, 2017; Snook et al., 2009), many education systems around the world have used it as the basis for professional development programs, and for policy directions.

Hattie argues that it is time for a reboot of Australian education (Hattie, 2017). Using NAPLAN results, he claims that too many schools are cruising. For the

purposes of this section, it is his prescription for the reboot that is important. Working from his effect size evidence, Hattie argues that success is produced by such factors as teachers working together to evaluate their impact ($d = 0.93$), giving students explicit success criteria at the start of a series of lessons ($d = 0.77$), developing high trust in classrooms so that errors are seen as learning opportunities ($d = 0.72$), and ensuring a balance of surface and deep learning ($d = 0.71$). There are of course many other factors on the list, but these are enough to demonstrate that for Hattie, teacher expertise, as defined by the effect size evidence, is much greater than structural influences such as class size, whether a school is public or private, or how students are grouped.

You will note here that Hattie is not arguing for a return to the past, nor for a focus on what students should learn (e.g. disciplinary knowledge), but rather on the process of learning and on teacher expertise. It is an argument that has attracted a great deal of support from media commentators and politicians who maintain that teacher union demands for extra funding to educationally disadvantaged schools, particularly public schools, are ill conceived. Ignoring external factors such as socio-economic status, or internal factors such as the quality of available human and material resources, they focus instead on teacher quality where, they argue, the emphasis should be on improving what currently happens rather than rethinking these (e.g. *The Australian*, editorial, 18 June 2017).

I have only used Hattie as an exemplar of this approach. There are of course many other educators and scholars who broadly accept the current organisation and operation of schools, while suggesting that certain aspects need rebooting. This might involve, for example, such disparate topics as new strategies for classroom management, adding student self-assessment to existing assessment approaches, or supplementing direct instruction with inquiry pedagogy – with each author proposing and defending their formula for improving the quality of teachers and teaching. In addition, some advocate for weaker versions of strategies described in the next section on reframing, such as personalised learning, or flipping the traditional model of teacher input in the classroom followed by application in homework activities.

The key point is that from a rebooting perspective, these strategies aim to refine or improve a particular aspect of pedagogy or curriculum, rather than make wholesale changes to practice on the basis of a very different philosophy. This focus on the processes of teaching and learning leaves largely untouched questions about what is taught and why, and the ways in which schools are organised and structured.

Reframe

The reframing approach starts with the changing world into which young people are moving, especially related to globalisation, technological change and new economies, and examines the implications for schooling. Although there are many different strands and approaches proposed, it is possible to identify a theme common to all of them: that traditional approaches to schooling are no longer adequate for meeting the demands of the contemporary world. Thus, the ways in which schools are preparing young people for that world – through curriculum, assessment, pedagogy, learning environments and so on – need to be reframed.

One dominant element is the claim that a curriculum based solely on disciplinary knowledge is insufficient for the challenges of new times. Thus, many education systems around the world are stressing the skills and dispositions needed for coping with the rapidly changing nature of work wrought by globalisation and new technologies. These are being identified and added to the official curriculum with labels such as competencies, capabilities and skills for the 21st century. They include skills and dispositions like critical and creative thinking, information literacy, communication, personal and social capacities, collaboration, intercultural understandings, resilience, agility and adaptability, and ethical understandings (e.g. Bellenca & Brandt, R, 2010; Fadel et al., 2015; Trilling & Fadel, 2009). The phrase *learning to learn* captures the aims of the approach to 21st century skills, and is often used as its overall descriptor.

There are also a number of well-known approaches that start from dissatisfaction with the disciplinary silos of the current official curriculum. These strategies try to reframe curriculum and pedagogy into a coherent and integrated whole. For example, some use a multidisciplinary approach that explores the disciplines through common themes (e.g.

Christian, 2004, 2018; Christian et al., 2014); some organise the curriculum through an interdisciplinary approach that focuses on common learnings or big ideas drawn from the disciplines (e.g. Spady, 2014); and some, like the Big Picture schools, employ a transdisciplinary approach to structure the curriculum around negotiated student questions, concerns, or interests that are explored through problem-based or project-based learning, often in real-life settings (e.g. Washor & Mojkowski, 2013). A common key element in the latter approach is using the funds of knowledge students bring to the learning situation, and building on these (Moll et al., 1992; Zipin, 2017).

Associated with a demand for curriculum change is the case for pedagogical change. Proponents of the need to reframe schooling maintain that if students are to become independent learners, there needs to be a shift from a teacher-led to a student-centred pedagogy. There are many proposals that fall under the banner of being student-centred. Some, such as project-based, inquiry-based, and problem-based learning, emphasise collaborative learning involving students working together to investigate questions or problems they have identified as being important to answer.

Other strategies take a more individual approach, such as personalised learning, which focuses on the learning of each child in order to enhance educational progress and achievement (Pane et al., 2017; Prain et al., 2015; West-Burnham & Coates, 2005). Tailoring education for every learner starts with an understanding of each learner's needs, upon which basis individual programs are designed to challenge and support their learning, and to monitor progress. In other words, learning starts with the learner not the teacher. Personalised learning is appearing in various guises around the world, sometimes in individual subjects supported by commercially developed materials, sometimes across the curriculum as a whole-school approach. Increasingly, its proponents are exploring the use of big data, learning analytics and cognitive technologies to help identify insights about individual students and possible learning pathways.

Inextricably linked with all of these different stances on integrated learning is the impact of digital technologies. Of course the use of new technologies is common to each of the four approaches, and is shaped by the philosophy of each. Thus, digital delivery can be used to transmit content (revert), or make current pedagogies more efficient (reboot). From a reframing perspective, the new technologies are a way to transform how education operates.

An example of this thinking can be found in the work of Greg Whitby (2013), who argues that the structures and processes of schooling are based on an industrial model that hasn't changed for the past 150 years. Thus students are organised by year levels into standard groups, and learn in a classroom with a teacher out the front. This model was designed, he says, for a different time and purpose, and must change since it does not meet the needs of the future.

Coming from a personalised learning perspective, Whitby maintains that technology should be used to help develop an alternative model of schooling, and not be seen as an end in itself. That is, it is not sufficient for students and teachers simply to use technology, but for technology to help in a rethink of pedagogy, school structures and learning spaces. Thus teachers should use the promise of digital technologies to provide opportunities for learners, individually and collaboratively, to follow and extend their interests and passions through project-based activities and problem-based learning, in flexible groupings and learning spaces. In short, technology, says Whitby, provides the opportunity to break free from the shackles of how schooling has always been done, to create a genuinely student-centred education that caters for the needs of all students.

In this section, I have only selected a small handful of examples from the huge range of reform literature to illustrate the essence of the reframe category. But they are enough to show that whilst the strategies vary, they are all based on the common belief that schooling, as it is currently organised and operated, is in need of some radical changes if it is to meet the challenges of the 21st century. It is important to note, however, that no matter how radical or reforming, this approach stills affirms the importance of schools as institutions. Such is not the case with the next, and final, of the four Rs, which rejects the schooling model altogether.

Replace

In essence this approach argues that schools are artefacts of the industrial age and should be phased out. The basis of this view is the fact that the world's knowledge is online and available at the click of a mouse, along with associated developments such as the digital revolution, AI, algorithms, machine learning and robots. Its proponents argue that the rapidity and impact of these technological changes have irrevocably changed the purposes and processes of education. Schools are no longer relevant in this new world and must be replaced by new approaches to learning. In this sense, the replace approach is a 21st century version of Ivan Illich's 1971 classic *Deschooling society*.

The genesis of the approach can perhaps be traced back to Professor Sugata Mitra and his famous hole-in-the-wall project. In 1999, Mitra placed a computer in an empty ATM hole in a slum area in New Delhi, and left it. He came back after eight hours and found children of many ages, most of whom had never used computers, browsing the internet and then using it to answer questions. He repeated the experiment in other parts of India, including small, rural and remote villages. For example, he set one group of children a question about DNA replication and came back two months later to discover that they had made some progress. Before he left again, he asked a young woman to be a surrogate 'granny' to the children by giving them encouragement and praise. Mitra claims that after another two months their progress was significant, and he began to publish about the approach, describing it as minimally invasive education (Mitra & Rana, 2001). In England he set up what he called the *granny cloud*, where volunteer grannies were available to provide help, advice and encouragement via skype to groups of children who were investigating key questions at various places around the world. He described these groups as self-organised learning environments or SOLE (Mitra, 2005).

In 2013, Mitra won a million dollars for presenting the best TEDX talk of 2013 about his School in a Cloud. During that talk he described what had happened, and summarised his conclusions and his developing educational philosophy. His starting point was the pronouncement that given that the information stored on the internet is available in the cloud at the click of a mouse, 'schools as we know them are obsolete ... they are wonderfully constructed ... it's just that we don't need them any more' (Mitra, 2013). With the right conditions, he said, learning just happens – we don't have to make it happen as schools do. Mitra's formula for the right conditions are broadband, plus collaboration, plus encouragement. In this model, not only traditional educational approaches, but also teachers, get in the way of real learning. Thus, a 'school' can be in the cloud with a curriculum organised around the 'big questions', with one teacher/facilitator to provide learning support.

Mitra became an overnight sensation and ironically, given that the implication of what he was saying is that teachers are redundant, he began to be a regular on the education conference circuit. By this time he had formed a company – HiWEL (Hole in the Wall Education Ltd) – and his experiments with the school in the cloud expanded to a number of other countries, including Cambodia, Nigeria and Botswana. In England, the approach was picked up and used in a few schools, leading some to argue that Mitra's learning formula and approach is applicable in school settings provided that significant curriculum and pedagogical changes are made (e.g. Quay, 2013).

Mitra's work attracted real interest from educational technology businesses around the world, especially in Silicon Valley. It wasn't long before it was being used to argue that technology in education settings has the potential to set children free. A number of American billionaires began to pour money into educational programs based on software packages and devices such as tablets and desktop computers (Peretti, 2017). Many of these programs are more individualised, or personalised, than the collaboration inherent in SOLE, but common to all of them is the fact that large groups of students can work on their own or in groups, with a single teacher whose role it is to be consulted only if the students have a problem.

At first glance, it might appear that the use of new technologies in this way is similar to strategies proposed by Whitby (2013) in the reframe approach described in the last section. But there is a significant difference. The reframers are not arguing that schools and teachers are obsolescent, rather that the new technologies offer the opportunity for schools to be organised more flexibly, with teachers playing a range of roles from instructors to facilitators of student learning. By contrast, from the perspective of the replace approach described in this section, technology is seen to offer new ways to learn that make schools and teachers redundant. Although this may not happen immediately, the advent of the digital revolution and AI such as robots substituting for teachers makes it inevitable.

What is missing from the four Rs?

As I explained at the beginning of Part A, the four categories – the four Rs – are a device for organising the mountain of literature that has been published about the direction education should take. While they are not discrete categories, and a number of similar strategies appear in two or more of them, albeit with emphases that vary according to the ontology of the category in which they appear, they are sufficiently different to be able to discern the motivation lying at the heart of each. They are summarised in Table 1 below:

Table 1: Categorising ways of thinking about futures in Australian education

Category	Central focus
<i>Revert</i>	strategies that reinstate the key features of the past
<i>Reboot</i>	strategies that focus on the quality of teachers and teaching
<i>Reframe</i>	strategies that depart radically from the past by making significant changes to curriculum, pedagogy, assessment and school organisation and culture
<i>Replace</i>	the promise of new technologies means that schools are becoming obsolescent and teachers either redundant or needed less

Although the four categories represent significantly different stances, it seems to me that each has a common key weakness. That is, each downplays, assumes or omits what are the purposes of education. In my view, it is not tenable to consider questions about future directions for schooling without a clear understanding and articulation of the purposes a broad approach to education is designed to achieve. Without an understanding of purpose it is impossible to assess the applicability, relevance and appropriateness of the strategies proposed for the future. This is an important insight for the development of the process I flagged in the introduction.

In Part B of the paper, I will take up the question of purposes, and suggest what they mean for the future directions of education. This will provide the ballast for a consideration of the process that will be used in the rest of the paper to help identify the kind of educational program that will best serve Australia's needs into the future.

“...it is not tenable to consider questions about future directions for schooling without a clear understanding and articulation of the purposes a broad approach to education is designed to achieve.”

PART B:

Towards a process for thinking about futures for Australian education

The absence of purposes

Purposes provide the rationale for any endeavour, and so give meaning to the goals and the strategies that are set in any educational system. When the public education systems were established in the various colonies in the late 19th century, it was clear that one of the primary purposes of school education was to conserve the established social order. The state decided that the economy needed workers with basic literacy and numeracy skills, and civil society required law-abiding citizens who would not threaten the status quo. Public schools were established and organised to achieve this purpose. Thus, compulsory public education was initially confined to basic or elementary schooling, with a narrow subject-based curriculum emphasising rote learning and testing. A more expansive secondary education was available, mainly to the wealthy who paid fees at private colleges (Campbell & Proctor, 2014).

However, over time the state slowly industrialised its economy and a number of social and political changes led to wider participation by citizens in democratic life. These developments meant that a different form of education was required, and so there were increasing expectations on the state to expand its educational provision. Gradually the purposes of Australian government schooling became less limited, resulting in changes to the nature and scope of schooling. Thus during the 20th century, the compulsory school leaving age slowly rose, the curriculum broadened, and increasing numbers of students began to attend secondary schools. School education came to be seen as central to the project of nation building. Not only did it enhance the life chances of individuals, but it also had a number of public purposes such as developing skills for the economy, and fostering the skills and understandings for active citizenship (Campbell & Proctor, 2014).

However, developments in the late 20th century and the first two decades of the 21st century have disrupted the settlement around the purposes of school education. Such developments as the rapidity of changes in science and technology, the increasing cultural diversity of Australia's population, the ubiquity of information and data now available at the click of a mouse, the globalisation of economies and cultures, and pressures on the environment, are all examples of trends that are challenging the very nature of work and citizenship. In this changing environment, what are the consequences for the purposes of school education?

As I argued in Part A, despite their importance the purposes of education are rarely the focus of educational discussion or debate in the public and professional arenas. Where they can be discerned, they are usually assumed or implied. And where they are described, it is often in a perfunctory way that suggests the fulfilment of a duty, before getting on with the real work of establishing goals and strategies. The result is that often the stated purposes have little obvious connection to the education strategies proposed.

The document prepared by the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) in 2008 purporting to set the future directions for Australian education – *The Melbourne declaration on educational goals for young Australians* – is a case in point. This 19-page statement starts with just one short paragraph alluding to purposes:

In the 21st century Australia's capacity to provide a high quality of life for all will depend on the ability to compete in the global economy on knowledge and innovation. Education equips young people with the knowledge, understanding, skills and values to take advantage of opportunity and to face the challenges of this era with confidence. Schools play a vital role in promoting the intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing of young Australians, and in ensuring the nation's ongoing economic prosperity and social cohesion. (MCEETYA, 2008)

That paragraph is followed by a very brief description of five major changes/trends in the world since the Adelaide Declaration of 1999 – global integration and social mobility; the rise of Asian nations; globalisation and technological change; complex environmental, economic and social pressures; and continuing advances in communication and information technologies. There is no detailed examination of the nature of these changes, nor what they might mean for the sorts of capacities that schools need to help young people to develop. Rather, on the basis of a short and very vague two-page preamble, the Melbourne declaration posits two goals and nine strategies (Commitments to Action) which make up the remainder of the document. The connection between the strategies, purposes, goals and strategies is unclear. This is an important point given that the Australian Curriculum and Assessment and Reporting Authority (ACARA) insists that the shape and detail of the Australian Curriculum is based on the Melbourne declaration.

Another example is the report of the Gonski review into ways to achieve excellence in Australian schools (Gonski et al., 2018). Beyond making a couple of vague statements about preparing young people for a ‘rapidly changing’ world or focusing on preparing students for the labour market, this key report does not make a case for what role education should play in meeting the challenges facing Australia in the 21st century.

The key point is that in the absence of a well-articulated set of purposes and an understanding of the implications of these for student learning, the setting of goals and strategies becomes a hit and miss affair. For a start, there are no criteria against which to judge if a goal is fit for purpose, or if the strategies are expansive or adequate enough. Gert Biesta (2012, 2016) argues that the absence of a consideration of purposes has resulted in the ‘learnification’ of education where there is talk of ‘learning’ and ‘learning spaces’, and a neglect of ‘what’ is learned. He goes on to claim:

The question of purpose is in my view the most central and most fundamental educational question since it is only when we have a sense of what it is we want to achieve through our educational efforts – and ‘achieve’ needs to be understood in a broad sense, not in terms of total control – that it becomes possible to make meaningful decisions about the ‘what’ and the ‘how’ of our educational efforts, that is, decisions about contents and processes. (Biesta, 2012, p. 38)

“The key point is that in the absence of a well-articulated set of purposes and an understanding of the implications of these for student learning, the setting of goals and strategies becomes a hit and miss affair.”

In short, any proposal for the future directions of education must start with a statement of purposes, and then use these to develop goals. Since it is now almost a decade since the publication of the Melbourne declaration, the time has arrived for the next iteration of the goals. It is fervently to be hoped that the consultation process and the writing of the new document will start with a deep consideration of the purposes of Australian schooling, and use these to guide the development of the document.

Recommendation 1:

That the Australian Secondary Principals' Association (ASPA) urges the Education Council to embark on developing the next iteration of the Goals of Schooling in 2018

Recommendation 2:

That ASPA urges the Education Council to use consultation processes that deeply engage the profession during the development of the next iteration of the Goals of Australian Schooling

Recommendation 3:

That during the development process of the next iteration of the Australian Goals of Schooling, ASPA submits to the Education Council that the document begin with a detailed outline of the agreed purposes of education, and that these purposes guide and inform the development of the goals and strategies that follow.

The purposes of school education and their implications

Building on the work of scholars from England and the United States (US) (Goodlad, 2008; Inglis, 2004; Labaree, 1997), and an Australian Research Council project in which I was involved with some colleagues in Australia (Reid et al., 2010), I propose that there are four key purposes of school education:

- The first is a *democratic purpose*. Schools are the main means society has to systematically develop young people as citizens who are able to play an active and constructive role in democratic life.
- The second is an *economic purpose*. Schools make an important contribution to the Australian economy by preparing people for work in the many occupations that comprise the contemporary and future labour markets.
- The third is an *individual purpose*. Schools provide opportunities for all children and young people to 'acquire knowledge that takes them beyond their experience' (Young & Lambert, 2014, p. 10) and which enables them to lead rich, fulfilling and productive lives. This purpose emphasises that there does not have to be a utilitarian purpose for education – it is significant in its own right.
- The fourth is a *social and cultural purpose*. Schools are an important means by which children and young people develop the understandings, skills and dispositions necessary to play an active role with their fellow citizens in a diverse and multicultural civil society.

There are at least five salient aspects to these purposes that should be noted and that have significant implications for schools. First, it is the mix of these purposes that make up the educational settlement at any historical juncture. In my view, in recent times there has been an unhealthy emphasis by policymakers on the economic purpose of education, at the expense of the other three purposes. This paper is based on the belief that although they may be expressed in different ways, each of the four purposes are important, and therefore it is a crucial and ongoing task to ensure that they are all represented in educational policy and practice.

Second, I have described the purposes in a neutral way, which masks the fact that when they are realised in practice they are based on values and assumptions that shape them in specific ways. Each purpose can only mean something when these values are declared and the detail is fleshed out. For example, the democratic purpose will result in very different practices depending on the understanding of democracy that informs it.

This might range from democracy being largely a matter of voting for representatives every three or four years, to being a process that encourages active and engaged participation in all aspects of democratic life. The point is that the role and nature of education will vary depending on the view of democracy adopted. In the rest of this paper it will become clear that an underlying value informing my view of each purpose is a belief that education should be instrumental in shaping a fairer and more socially just society.

Third, the purposes have public as well as private benefits in mind. That is, the outcomes of school education go beyond individual interest. A democratic society depends on its citizens being in possession of a range of what Connell (1995) calls ‘capacities for social practice’, that is capacities¹ that enable them to contribute to the economy, the polity and the civil society, to lead productive and fulfilling lives, and to contribute to social change. It doesn’t advantage society to have people who lack these skills and understandings, who are alienated and disenfranchised, or who act purely from self-interest. This makes equity a central concern for school education. It must ensure that ALL citizens have the same opportunities to develop the capabilities implied by the purposes – a challenge that has consequences for curriculum, school structures and resourcing. In a democratic society something as basic and important as school education should not be provided unequally on the basis of wealth or birth.

Fourth, the purposes reaffirm the importance of schools as institutions. Thus, the achievement of successful outcomes related to each purpose demands a systematic approach led by people with expertise. Since schools comprise teachers trained to work with children and young people, they are better equipped than any other organisation in our community to undertake the educational task. In addition, the four purposes have an important social as well as individual emphasis, and so demand an educational approach that encourages group and collaborative work, rather than solo learning. As social institutions that place young people in an environment with many of their peers on a daily basis, schools are unlike most other organisations in our society. In short, the purposes described above suggest that Mitra’s claim that schools are obsolescent (see Part A) fails to take into account the important social function of schools.

Fifth, each of the purposes implies that there are a number of understandings, skills and dispositions that schools should aim to develop in students. This demands looking at each of the sites served by schools – the polity, civil society, the economy and the individual – and asking about the capacities for social practice that are needed to operate productively in each. It doesn’t automatically follow that it should be the job of schools to nurture all of these capacities – presumably some may be best developed through other sites such as the family or workplace – but most will require skilled educators for optimum development.

It follows from the fifth point that educators, as well as politicians and the community where possible, need to systematically and regularly analyse and discuss the main developments and trends in society, as a prelude to developing policy and practice in education. As suggested earlier in the introduction, it is this process that is the missing element of the futures focus, and the reason that a futures orientation has failed to gain any traction in education policy making. It is time therefore, to examine what might be entailed in such a process.

Designing a process for thinking about futures for Australian education

Why design a process for thinking about futures for Australian education?

The analysis so far has demonstrated that many policy approaches purporting to meet the challenges of the future are flawed because they ignore some fundamental considerations: educational purposes, the educational implications of contemporary trends in society, and blockages to educational change. The Gonski 2.0 report is a case study example of these omissions (Gonski et al., 2018).

¹Note: In Parts A–C of the paper, I use ‘capacities’ as an overarching term for knowledge, skills, dispositions and values. In Parts D–F, when I discuss curriculum matters, I follow the terminology of the Australian Curriculum, where knowledge is represented in the learning areas, and generic skills, dispositions and values are described as general capabilities.

“Established to set out a blueprint for Australia’s educational future, the Gonski report falls at the first hurdle by not exploring the purposes of education in the 21st century.”

Established to set out a blueprint for Australia’s educational future, the Gonski report falls at the first hurdle by not exploring the purposes of education in the 21st century. Beyond a vague reference to a ‘rapidly changing’ world, or to preparing students for the labour market, the report does not make a case for education’s role in meeting the challenges facing Australia. As argued in the last section, an identification of the purposes of schooling is surely a non-negotiable requirement for any consideration of educational strategies for the future. Without a declaration of purposes, we don’t have a reference point against which to assess the adequacy of the recommendations.

Despite its claimed concern to bring education into the 21st century, the report is also surprisingly free of any reference to some key current and future challenges – including environmental challenges, threats to democracy, the implications on work of such developments as AI, robotics, machine learning and so on. Without a consideration of purposes and the implications for education of key societal issues or trends, the Gonski recommendations comprise sheer guesswork. There is no obvious link between what it proposes and the nature of the challenges.

“...a plan for the future must take account of the factors that will impede change.”

In addition, the report fails to consider the blockages to any of its change proposals. Given what we know about the nature of educational change (e.g. Fullan, 2015) surely a plan for the future must take account of the factors that will impede change. For example, one important factor is the need to involve in decision-making those who are expected to implement any change. Despite the lack of involvement of principals and teachers, the Gonski 2.0 report recommends that major changes be made to the Australian Curriculum (progression levels) across all learning areas and general capabilities in the next three to five years. It ignores the fact that the Australian Curriculum has only been implemented recently and that teachers are still learning and trialling the best ways to work with it. Instead, the report recommends a significant change – without involving teachers in trials and discussion, and without the evidence to show that what it recommends is an improvement.

“...one important factor is the need to involve in decision-making those who are expected to implement any change.”

The analysis so far has helped to identify some flaws and omissions that are common in educational policymaking, and to explain why the standardising agenda has remained so dominant. The key to future planning lies with developing a process that addresses each of them. In this section I will propose a process that might be used by policymakers and schools as an approach to thinking about the future in Australian education, whilst addressing the flaws of the dominant model. Thus, the process starts with an understanding about the purposes of education and returns to these at appropriate intervals, involves an in-depth investigation of key societal issues and their educational implications, and takes account of the blockages to suggested changes.

What is the process?

The six-step model I am proposing is based on the strong belief that it is crucial to develop a deep understanding of a societal trend or issue, before identifying its implications for educational policy and practice. Thus education is not considered until the fourth step of the process. This is an attempt to overcome the weakness of futures-focused education reports that offer a superficial coverage of contemporary and future change, before making a giant leap to policy proposals.

The reference point for the investigation of the societal issue is the purposes of education, and so it is assumed that these are agreed and kept under review over time.

The six steps of my proposed model follow.

Step 1: If, as I have argued, thinking about education policy and practice from a futures perspective should start with an examination of key societal trends, then Step 1 in the process will involve identifying one or more trends, understanding its parameters and exploring it in depth. By trends I am thinking of such broad themes as:

- *environmental* challenges brought about by climate change and the depletion of natural resources
- massive *economic* changes wrought by innovations in science and technology, including developments in bio-technology, nanotechnology, AI, and machine learning; and financial interdependence
- *social and cultural* challenges such as the increasing diversity of populations produced by such factors as migration, population growth and urbanisation; the social dysfunction created by job displacement and growing inequalities of wealth within and between countries; and war and terrorism
- challenges to *democracy* brought about by such disparate factors as social media, meta-data, fake news and the rise of populist politics.

All of these key societal trends demand a response by governments, agencies and individuals at regional, national and global levels.

Step 2: Having grappled with the nature and extent of the selected trend, Step 2 involves investigating its impact, using the domains represented by the purposes of education as the reference point for the analysis: work and the economy; democracy; and the individual social and cultural life.

Step 3. If the response to these trends is to be informed, appropriate and timely, citizens as well as policymakers need to have a range of capacities to analyse the trends and to act. Thus, having identified what are thought to be the impact of the trend in the various domains, the task in Step 3 is to describe the capacities (knowledge, skills and dispositions) people will need to handle the trend in order to achieve socially and individually desirable outcomes. It should be noted that this step will involve clarifying the values that inform analysis and decision-making.

Step 4: In this step, education is foregrounded for the first time in the process. This involves identifying which of the capacities described in Step 3 should be allocated as the responsibility of schools, and then deciding how these capacities should be represented in, and developed through, the curriculum (what is taught), and pedagogy and assessment (how it is taught). There will be a range of possibilities here, from confirming or making minor modifications to existing policy and practice, to planning and implementing significant changes to curriculum policy and/or practice.

Step 5: This step looks at the environment into which the changes are to be introduced. It is based on the assumption that if there are policies and practices inconsistent with the proposed curriculum changes, it is unlikely that such change will result in the outcomes planned until the blockages are identified and removed. Obstacles to change can be present in classrooms, schools and education systems as a whole.

Step 6: If the change is to occur in more than name only, then there must be a set of supporting conditions. These range from physical resources, to human resources, to the culture of an organisation, and they need to be tailored to suit the demands of the change. The role of Step 6 is to identify the conditions and practices that will support the change.

Table 2 summarises the six-step process.

Table 2: The steps of a process for thinking about futures in Australian education

Steps	The focus of each step
Step 1	Identify a broad societal trend and explore it through research, reading and discussion.
Step 2	What is the impact of this trend, particularly on those areas covered by the purposes of schooling: work and the economy; democracy; and the individual, social and cultural life?
Step 3	On the basis of our analysis in Step 2, what understandings, skills and dispositions do people, individually and collectively need to handle the issue so that there is a good/ socially desirable outcome? (Note: this step will involve clarifying the values which inform your analysis and decision-making).
Step 4	What are the educational implications of the responses to Step 3? How can they be built into (a) the official curriculum and (b) pedagogy and assessment, and what needs to change?
Step 5	What stands in the way of implementing the curriculum changes arrived at in Step 4 (policies, established practices, resources)?
Step 6	What conditions and practices will enable the changes identified in Step 4?

Where will the process be used and by whom?

In the first instance I intend to use the process in this paper to inform my analysis of possible futures for Australian education, and arrive at recommendations for ASPA. In so doing, I will also be able to test the efficacy of the process and consider its usefulness for other purposes. In particular I suggest that, given the process has a wide scope and sweep – it takes in the official curriculum, approaches to teaching and assessment, accountability and cultural factors – it can be used at system-wide levels for thinking about educational futures. However, I will argue that school-based educators need to be intimately involved at each stage. Marginalising educator voices as the standardising agenda has done for so long is not an approach suited to the 21st century.

Although I have developed the six-step process as the scaffolding for a broad analysis that has a national focus, it doesn't mean that the process cannot be used by individual schools or groups of schools. Indeed, it would be an ideal way to engage all stakeholders in a school community – educators, students, parents – in ongoing discussion and debate about educational purposes, curriculum and pedagogy, and the future. However, it would need some planning and resource support – not the least being the need to release schools from some of the counterproductive burdens of the standardising agenda. Of course, there are obviously many other possible models. Schools and systems could try the approach in this paper or a modified version of it, or develop their own. In the first instance, professional associations and/or systems could trial the framework in different forums.

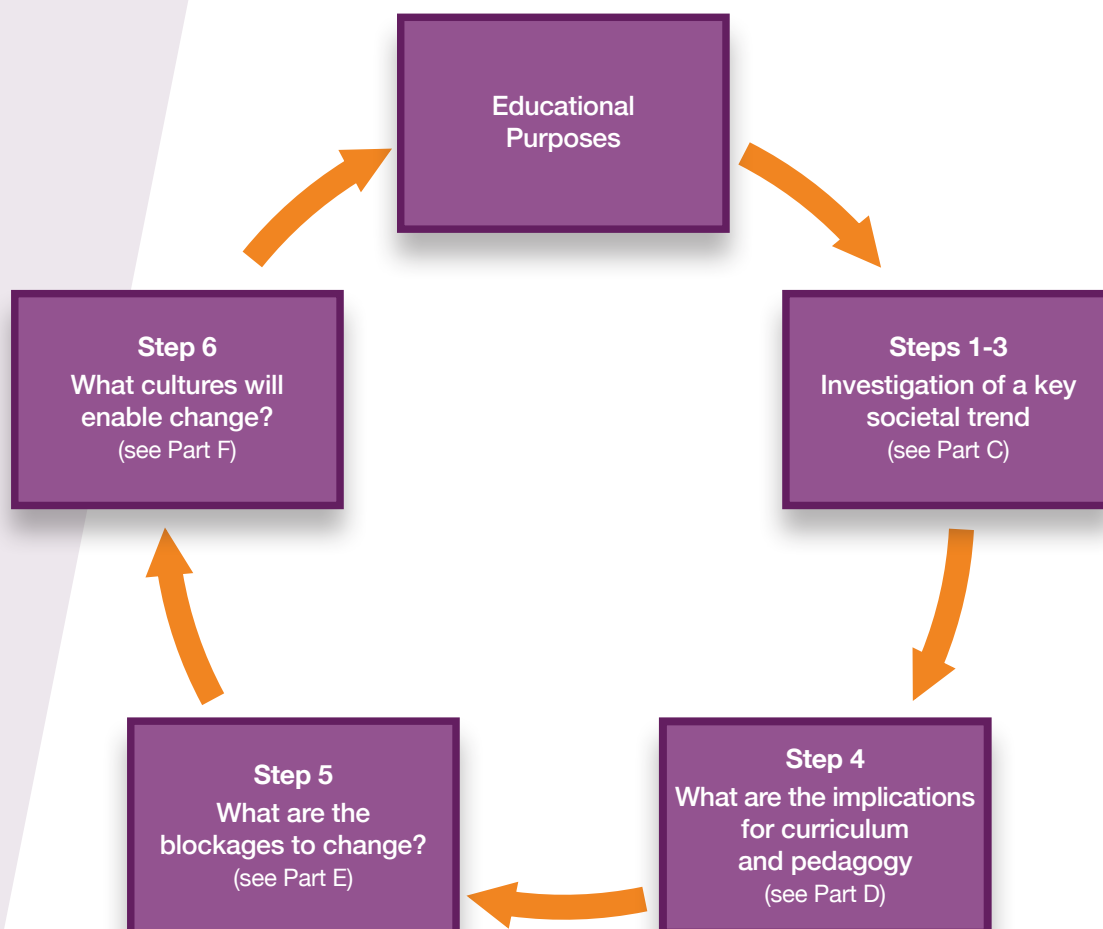
The importance of educators engaging in discussions about broad societal trends and their educational implications may seem to be an obvious point, and yet it seems to me that most professional conversations avoid such discussions. If it occurs at all, it is usually in a perfunctory way, naming the trends and then jumping to a description of what are seen as educational approaches that best suit the future, without doing a deep analysis of what these trends mean for the work of schools.

Recommendation 4:

That ASPA and/or its state and territory affiliates select a major social, political, environmental or economic trend to be the focus for a conference at which the proposed six-step process is modelled.

Notwithstanding these possibilities, in the rest of paper I will use the process to arrive at a broad framework for Australian education that can meet the challenges of the future. I will attempt to test the process by modelling it in action through an exploration of the impact of the momentous shift to digitalised technologies. The steps of the process will be followed through Parts C – F of the paper as described in Diagram 1 in the Executive Summary, and reproduced below.

Diagram 1: A process for thinking about futures for Australian education



PART C: Steps 1–3

An investigation of a key societal trend – the third/fourth industrial revolution

Part C covers Steps 1-3 of the process. It is based on the argument that if educational responses are going to be appropriate to meeting the challenges of the future, they must be based on a deep understanding of what is entailed in the challenges. Thus Steps 1-3 deliberately avoid educational considerations, focusing instead on the kinds of capacities people need to shape and work productively with the broad trends that are changing our societies.

Step 1 involves selecting and describing a key contemporary societal trend, and for the purposes of the case study I have chosen the third/fourth industrial revolution. I will move backwards and forwards between Steps 2 and 3 as I engage in an analysis of the impact of the trend (Step 2) and an identification of the capacities needed by people to shape and work productively with the possibilities it produces (Step 3).

Step 1: Identifying and investigating a broad societal trend – the third/fourth industrial revolution

In 2011, Jeremy Rifkin, the American economic and social theorist, published *The third industrial revolution: How lateral power is transforming energy, the economy, and the world*. The book uses an historical analysis to explain how, over the past 250 years, three industrial revolutions have created wholesale societal transformations in the way we work, live and govern ourselves. Of course, none of these three revolutions are discrete – each develops with elements of the previous revolution continuing to operate in the next for quite some time. What is common to each industrial revolution is the emergence and then convergence of technologies, which take on a new form in each revolution and fundamentally change the way we manage, power and move economic activity. Rifkin describes this process as involving:

... new communication technologies to more efficiently manage economic activity; new sources of energy to more efficiently power economic activity; and new modes of transportation to more efficiently move economic activity. Each of these defining technologies interacts with each other to enable the system to operate as a whole. (Rifkin, 2016)

Thus, in the first industrial revolution, the three technologies were steam-powered printing and the telegraph (communication), coal in plentiful supply (energy), and steam-powered locomotives (transport). Those three technologies changed with the arrival of the second industrial revolution in the 20th century involving centralised electricity, telephone, radio and television (communication); cheap oil (energy); and internal combustion engines (transport).

Rifkin proposes that in the late 20th and the 21st centuries, societies are transitioning – at different speeds – to a third industrial revolution, which is building a new system-wide infrastructure based on digitalisation. Even while economies are still closely tied to the second industrial revolution with its reliance on fossil fuels, elements of the third industrial revolution are beginning to disrupt old ways of doing things, spurred by increases in computer power, growth in the amount of online data sets for machine learning, and the development of powerful algorithms that are used for a multitude of purposes. These developments are used in different ways by and through such disparate technologies as personal computers, mobile phones, social media, data storage, renewable energy technology, robotics, AI, 3D printing, nanotechnology, gene editing, GPS tracking, autonomous vehicles, digital music and so on. They are changing entire systems of work, governance and production in our society.

Rifkin proposes that these digitalised technologies contain the new forms of the three elements in a third industrial revolution that is changing the ways we manage, power and move economic activity. It involves:

... a digitalized communication Internet ... converging with a digitalized renewable Energy Internet, and a digitalized, GPS-guided and soon driverless Transportation and Logistics Internet, to create a super-Internet to manage, power, and move economic activity across society's value chains. These three Internets ride atop a platform called the Internet of Things ... [where] sensors will be embedded into every device and appliance, allowing them to communicate with each other and Internet users, providing up to the moment data on the managing, powering and moving of economic activity in a smart digital society. (Rifkin, 2016)

Such has been the breathtaking speed and impact of these developments that the Chairman of the World Economic Forum, Professor Klaus Schwab (2015, 2016), has argued that we are now in a fourth industrial revolution. In this revolution the lines between physical, digital and biological spheres are being blurred:

Already, artificial intelligence is all around us, from self-driving cars and drones to virtual assistants and software that translate or invest. Impressive progress has been made in AI (artificial intelligence) in recent years, driven by exponential increases in computing power and by the availability of vast amounts of data, from software used to discover new drugs to algorithms used to predict our cultural interests. Digital fabrication technologies meanwhile are interacting with the biological world on a daily basis. Engineers, designers and architects are combining computational design, additive manufacturing, materials engineering, and synthetic biology to pioneer a symbiosis between microorganisms, our bodies, the products we consume, and even the buildings we inhabit. (Schwab, 2015)

Certainly, the speed, scope and impact of such developments is almost without parallel. However, Rifkin (2016) argues that since the developments Schwab describes are built on digitalised technology, we are in a new phase of the third industrial revolution, rather than entering a fourth. But rather than be distracted by nomenclature, I will refer to it as the third/fourth industrial revolution. Whether it is called a third or fourth industrial revolution, doesn't alter the fact that the speed at which change is now happening – and with quantum computing on the horizon it can only get quicker – and the potential for it to have positive or adverse, even dystopian, effects highlights the importance of a community-wide understanding about, and response to, what is happening.

Rifkin believes that the third industrial revolution has the potential to transform societies from unsustainable, mechanistically designed and constructed entities, to environmentally sustainable, economically distributed and socially networked ecologies. In particular, he believes that since this revolution will reduce the human footprint on the environment, it can combat environmental degradation and the threats posed by climate change. On the other hand, many writers are concerned about the dangers posed by the third/fourth industrial revolution, citing the dark side of internet activity such as cyber bullying, cybercrime and terrorism (the 'darknet'), and maintaining that the ways in which digitalised technologies are currently being used could exacerbate inequality, heighten tensions between groups, diminish democracy, and lessen our humanity (e.g. Avent, 2016; Harari, 2016; Keen, 2018).

The fact is that the outcomes of the third/fourth industrial revolution are not predetermined: it will be the response of humans that will determine what happens – and education is one of the central elements of such a response if we are to shape, rather than be shaped by, these developments.

How then do we make sense of the third/fourth industrial revolution in order to make decisions about what role schools can play in meeting the new challenges? If, as I have argued, such considerations need to address the purposes of education, the next step is to examine what the third/fourth industrial revolution means for each of the educational purposes outlined in Part B. It is to that task I will now turn.

“...the outcomes of the third/fourth industrial revolution are not predetermined: it will be the response of humans that will determine what happens – and education is one of the central elements of such a response if we are to shape, rather than be shaped by, these developments.”

Step 2a: What are the implications of the third/fourth industrial revolution for work and the economy?

For the past century in Australia, work has been important not just as the basis for sustaining and building the standard of living of the society as a whole, but for individual financial security, mental and physical wellbeing, and meaning and self-identity. Young people have been able to assume that work will be available, and educational institutions have played an important role in preparing them for the workforce. Generally, this has been successful, and Australia has experienced low levels of unemployment, growth in wages, and sustained economic growth. The indications are that the impact of digital technologies on work are already disrupting that economic settlement, and that over the next two decades our understanding of work will begin to change irrevocably.

Automation – AI, robots, driverless cars and so on – is already taking the place of workers in routine manual jobs, such as labourers and assembly line workers, and routine cognitive jobs, such as office assistants and clerks (Peretti, 2017). At the moment, these jobs are being replaced by non-routine manual jobs, such as in the service and security industries, and non-routine cognitive jobs, such as technical engineers and healthcare. Thus, over the past 25 years, the percentage of unskilled workers in the Australian workforce has declined by over 10%, whilst there has been a corresponding increase in the percentage of skilled workers (Foundation for Young Australians, 2015, p. 6). Indeed, the level of unemployment in Australia since the 1990s has declined, and the aggregate hours worked by the Australian population, on a per capita basis, has remained stable since the mid-1960s (Borland, 2017).

The big question, however, is whether this pattern can, or will, continue. There is a range of different interpretations and predictions about the future of work in the literature, and it is impossible to be definitive. The only thing that can be said with any certainty is that in the near to medium future the shape and the nature of work will change significantly.

The new information technologies have taken globalisation to a new level, enabling workers in other countries to engage in jobs previously done in Australia remotely; and the rate of automation will increase rapidly, with AI and robots either taking or altering existing jobs. One influential study in the US estimates that 47% of jobs are under threat of automation in the next two decades (Fray & Osborne, 2013), and a number of other studies support this contention (e.g. Ford, 2015; West, 2018). In Australia it is estimated that 70% of young people currently enter the workforce in jobs that will alter dramatically as a result of automation over the next 15 years, and that 60% of young people are being trained in jobs that will be radically altered by automation

“The only thing that can be said with any certainty is that in the near to medium future the shape and the nature of work will change significantly.”

“...there needs to be a community-wide recognition that the nature of work is changing.”

(Foundation for Young Australians, 2015, p. 4). This won't only affect unskilled jobs, but also start to impact on non-routine cognitive work. For example, technology has increased the productivity of some highly skilled workers, and so enabled companies to downsize the workforce and concentrate on economies of scale (Avent, 2016).

However, when thinking about the future of work in the medium term (i.e. to 2030), it is important not to be too deterministic or pessimistic about the impact of automation on work. At present, there are many jobs that robots cannot undertake, since the technology is at a stage where robots can only be programmed to do quite specific tasks – Walsh (2017a) calls this ‘weak AI’ – rather than more complex ones that require the tacit and more nuanced knowledge that human workers possess. It is likely that in more skilled occupations, robots will be used to augment human labour rather than replace it – collaborative robots (cobots) that work alongside humans. In addition of course, new jobs will be created as a result of the digital revolution, such as the start-ups made possible via digital platforms, and the need for human workers to program, monitor, maintain and repair the robots (Flynn & Robu, 2017).

The point is that in the near- to medium-term future there will be a mix of old and new jobs leavened by the new technologies, which will alter work as we have known it, but the outcomes of which are not inevitable. The impact of the change will depend largely on the capacity of humans to rethink the nature of work and to develop new strategies. For example, in a recent report, *The new work mindset*, the Foundation for Young Australians proposes that work can be organised into clusters, with each cluster having a broadly similar knowledge base and skills that are portable across the many different occupations that comprise that field of work category. Such a model helps to make sense of the changing patterns of work and broadens career options when it is applied to pre- and in-job training,:

Of the 7 clusters of work: The Artisans and The Coordinators are likely to experience lower growth and high exposure to automation; The Generators and The Designers are likely to experience moderate growth and medium exposure to automation; and The Carers, The Informers, and The Technologists are most likely to grow and persist into the future. Over time, the jobs that comprise these clusters of work will change, as will the names and number of clusters of work. More job clusters may arise, based on new occupations and new skills being demanded and valued by employers. (Foundation for Young Australians, 2016, p. 9)

At the same time, there needs to be a community-wide recognition that the nature of work is changing. The traditional idea of the fulltime worker in one job for life is disappearing, and being replaced by the flexible worker who will change jobs many times across the course of her/his working life, and may even have a number of employers at the same time. An OECD (2015) report argues that more than half the jobs growth in OECD countries since 1990 has been in roles that are part-time, temporary or self-employed; and in 2014 research firm Eldeman Berland estimated that 30% of the Australian workforce have flexible casual and/or part-time work arrangements, such as being moonlighters, freelancers and independent contractors. Rifkin (2016) argues that these flexible work arrangements may lead to a new economic paradigm – the sharing economy – where, as machines take work, people move from producing and selling goods to selling services on a digital platform. People will develop portfolios comprising paid work with a number of employers at any one time, unpaid community service work, and increased leisure time.

Beyond the next two decades, however, it is impossible to say if such arrangements will continue, or if work as we know it will exist at all. The growth in machine learning means that robots will develop an artificial general intelligence enabling them to engage in far more sophisticated tasks than is possible at the moment. This has caused many scholars to talk about the end of work, and many are discussing the features of a post-work society (e.g. Frayne, 2015; Srnicek & Williams, 2015; Thompson, 2015).

As well as changes to the type and nature of work, there are many work-related social and political issues arising in the medium and long term by the impact of the digital revolution on work. For example, in the medium term there are issues related to work conditions. In the shift to more flexible working arrangements with multiple employers, how are important and hard-won working entitlements such as holiday and leave arrangements (e.g. sick, long service and parental leave) and minimum wage structures retained and exercised? This is particularly the case in the gig economy, where workers are finding that the promise of immediacy and flexibility is offset by the lack of security and worker rights (Kessler, 2018). It will be important that workers in the new workplace can combine to ensure they are not exploited by the changing arrangements, and can devise approaches suiting the new circumstances.

Some writers warn about the dangers of a two-tier society that might be produced in the longer term by the impact of automation, with a small number of well-paid elite workers and a vast majority of people being either unemployed as robots take their jobs, or engaged in low-paid work that is cheaper for humans to do than it is to use machines. I will deal with the social impact of this scenario in the next two sections, but here I want to make the argument that such a dystopian future is not inevitable if people have the political skills to ensure that our society takes the issue seriously.

It might mean for example that, at this early stage in the digital revolution and no matter how sophisticated AI becomes, as humans we decide which jobs we want machines to take and which not, and how the existing work can be distributed. It might also mean that as a society we should begin to talk about the strategies for a post-work society, such as a universal basic income, so that work is no longer such a central part of our lives; how we might widen the concept of work to include parenting, caring and volunteer work; and how as a society we can value and promote the opportunities provided by more leisure time.

In summary, students entering school today are going to live through significant changes to work that will have a number of individual, social, political and economic consequences. If personal and social dysfunction is not to result, it is clear that people won't only need knowledge, skills, dispositions and values that suit the changing circumstances of work, but also to enable them to critique and shape the way work is constructed now and in the future. For the rest of Part C, I will describe these using the overarching term capacities to differentiate them from the term *capabilities*, which has a more specific curriculum meaning discussed in Part D.

What then are the work-related capacities that are suggested by this analysis?

Step 3a: What work-related capacities are needed to handle the impact of the third/fourth industrial revolution?

There are at least three aspects to the capacities needed for the new workplace. First, no matter how much work changes, and for as long as work exists, there will be a need for skills and understandings that relate to specific jobs or clusters of jobs. These might be the focus of qualifications or certificates and/or they might be learned on the job.

Second, there are general skills and understandings that apply to most or all employment settings. These generic capacities are crucial if people are to work productively in a changing workplace, and they are therefore shaped by the nature of work and its possibilities.

Third, I have argued that while the third/fourth industrial revolution has the potential to remake the idea of work, as well as the nature of work, its consequences are not inevitable. That is, workers and employers can use the promise of the new technologies to shape socially and individually fulfilling responses, rather than be passive recipients of the consequences. This means that people must have the political skills and dispositions to deal with such challenges – and yet these capacities are rarely enumerated in the many lists of what the new worker needs.

I have drawn the following list of capacities for the changing workplace that will cater for these three aspects from the implications of the discussion in this section.

- *Knowledge and lifelong learning capacities:* Workers of the future will still need the foundational skills of literacy, numeracy and digital literacy, as well as the knowledge, skills and understandings relevant to the field of work in which they are engaged. But if work is to change radically as described above, then workers must have the capacity to upgrade/update their work knowledge on a regular basis, and to retrain where necessary. In addition, if the amount of time spent at work is to decline as a result of automation, or if we move towards a post-work society, people will need to have the knowledge and capacities that enable them to pursue creative interests, such as music, the arts and making things; enjoy community involvement; re-engage with families; and participate in volunteering activities. Thus, the capacity and appetite for lifelong learning is an important attribute.
- *Capacities for the new work contexts:* If the meaning and nature of work is going to undergo the kind of significant change described in this section, then the worker of the future will need to have a number of capacities including:
 - *Thinking capacities* – machines may be going to do most of the routine work, but we have not yet been able to automate tasks that demand human qualities that relate to thinking and feeling. This means that in the near future workers need to develop and use such thinking skills as critical thinking, judgement, creativity, computational thinking (i.e. understanding the fundamental principles of computation), problem-solving and communication.
 - *Social capacities* – if workers are going to have to spend less time on routine individual tasks and more time working with others, including working for more than one employer in different settings, then they will need to have skills for collaboration, team work and interpersonal relations.
 - *Political capacities* – if workers are to protect working conditions, help to shape the extent of automation as applied to jobs, and prevent the digital revolution from widening inequalities, then they will need to possess knowledge about our political system; be able to exercise such political skills as lobbying, advocacy and networking; and have interpersonal skills and a disposition to work for the common good.
- *Dispositions for the new work environments:* If work is important to the shaping of such personal dispositions as self-identity and feelings of self-worth, then in a changing working environment, people will need to be resilient, open-minded, respectful of difference, empathetic and committed to the common good.

Step 2b: What are the implications of the third/fourth industrial revolution for democracy?

One of the early promises of the digital revolution was that it would enhance democracy. In contrast with pre-internet times, it was claimed that the internet provided access to a greater range of news outlets and so would diminish the power of a small number of media monopolies; and at the same time, it would foster political participation by enabling people to express their views to a much wider audience. Citizens could engage in horizontal communication with their government, which in turn could make new and powerful connections with their electorate. Rifkin (2014) goes further and argues that the internet can be seen as a 'collective commons' in which anyone can post, download and read material for the purposes of sharing for the collective good. Such collaboration can be systematised through common platforms like Wikipedia, the free online encyclopedia created and edited by volunteers around the world.

Notwithstanding such possibilities, the digital revolution poses a number of dangers to some of the key features of democracy that can only diminish, rather than democratise, the public sphere (Runciman, 2018). These need to be identified and dealt with if the internet's contribution to democracy is to be more than an empty promise.

A major concern is the negative impact that the digital revolution is having on our representative form of democracy, especially on the process of elections. At the heart of the problem is big data, which works by gathering large amounts of personal data from social media and using a powerful algorithm to analyse it to develop detailed profiles of individual voters. This enables political parties to identify each voter's emotional triggers and so tailor messages to suit each profile. One high-profile example is that of Cambridge Analytica, the data mining and analysis company which, without authorisation, took the personal Facebook data gathered from 50 million Americans in order to target them with personalised political advertisements during the 2016 American Presidential elections (Cadwalladr & Graham-Harrison, 2018). Such hyper-targeting lacks transparency and accountability. As Hendrix and Carroll point out in the US context:

Deploying hypertargeted voter media that constructs narrow or outright fabricated versions of the truth to influence small subsets of voters in strategically important geographies is a scenario our founding fathers never imagined. (Hendrix & Carroll, 2017)

Of course, attempts to manipulate the population using propaganda techniques has long been a feature of politics, but the digital revolution has sped up the process. It feeds into and builds individualised and self-interested attitudes to voting, and diminishes any sense of the common good. As Grayling points out:

... in our present day highly sophisticated techniques are employed by partisan interests to target different facets of the uninformed, prejudiced, self-interested, emotionally driven attitudes of different constituencies of the many, to aggregate them into voting for an outcome which is the partisan interest's own preference ... The aim of the architects of representative democracy was to prevent a single interest from dominating: in the distortions that representative democracy has suffered, new manipulators have found a way to pervert that aim. (Grayling, 2017, p. 148)

A broader but related concern about social media relates to its toxic impact on civil society as a whole. Social media is tending to drive people into like groups where their opinions and beliefs are constantly reinforced. In these echo chambers, people only talk to others with similar views – silos of sameness where biases are confirmed and alternative views rarely considered (Hull, 2017). This intellectual isolation is exacerbated by website algorithms used in, say, Facebook or Google searches, that now selectively guess what information a user would like or want to read based on previous searches. In this way, users are rarely exposed to points of view that vary from their own – isolating them in their own ideological 'filter bubble' (Pariser, 2011), closing minds and reducing the possibility of a truly democratic discourse.

The quality of democratic discourse in the public sphere is also reduced by the proliferation of fake news and conspiracy theories, which are fanned by the speed and reach of the internet. False claims are circulated quickly and across many sites, and are therefore difficult to rebut. As Susaria argues:

The societal consequences of fake news – greater political polarization, increased partisanship, and eroded trust in mainstream media and government – are significant. (Susaria, 2018)

And at a time of the ‘death of expertise’ where Google has replaced the expert and people reject the concept of expertise itself, it becomes difficult to contest false information (Nichols, 2017). There is a widespread assumption that one opinion is as good as another, no matter the content.

“There is a widespread assumption that one opinion is as good as another, no matter the content.”

The quality of democratic discussion is also adversely affected by the lack of time for reflection on the complexity of issues. A 24-hour news cycle heightens the immediacy of any single issue and action is quickly organised through social media via hashtag democracy such as Twitter campaigns. Disagreement is expressed through anonymous abuse, and those with the shrillest voices are heard. These factors combine to diminish the possibility of a healthy and respectful conversation in the public sphere and so weaken democracy itself.

A further threat to democracy brought about by the digital revolution is the power governments now have at their disposal to increase their control over populations through pervasive surveillance systems and access to meta-data that can be gathered about citizens. The global surveillance systems unmasked by the Snowden affair in 2013 – all facilitated by the new technologies – raise serious questions about the relationship between the individual and the state (Greenwald, 2014). In the global war against terrorism, it is tempting for governments to use AI to look for potential threats. But surveillance of this sort raises a number of questions for any democracy, such as how the need for public safety can be balanced with civil liberty concerns about invasion of privacy. At a time when China is using algorithms to compile information about all citizens’ lives in order to calculate a ‘social credit’ score that will impact on their ability to access public services and obtain loans (Zeng, 2018), there is an urgent need for discussions about the limits to what data can be gathered, how and by whom.

If democracy in a nation state is posited on the legitimacy of its government to regulate aspects of the society, and to be held accountable by the population for that, then there is a serious democratic concern about the collective power of the five big tech companies – Apple, Amazon, Google, Facebook and Microsoft. These companies have become so successful that they now provide things that no one can do without. In earlier times, they would have been seen as public goods, owned and controlled by governments. But when private companies operate them globally, it is difficult for any one nation state to regulate and control them and address questions like ‘fake news’ (Aldrick, 2018). Relying on private companies to act in the public interest rather than their own self-interest is fraught with danger. As the power of the large technology companies grows, so the legitimacy of governments starts to weaken. This raises important questions for any democracy.

Similarly, the emerging field of AI risks is largely in private hands. Since every technology can be used for good or ill, it is important that democratically elected governments can ensure that AI developments are used to benefit humanity. This means creating incentives for companies to use the power of AI to address such big challenges as climate change, poverty and inequality, rather than focus on such developments as lethal autonomous weapons to wage war, including killer robots, drones and automated machine guns. At the same time, it will be important not to fall prey to ‘AI solutionism’ – the belief that if given enough data, machine learning algorithms can solve all the world’s major problems – thus creating unrealistic expectation about what AI can really do (Polonski, 2018).

It also means tackling the ethical dilemmas attached to the deployment of nearly every new technology, and ensuring that there are appropriate regulations and controls (Harland, 2017; Sample, 2017). The community must contribute to the development of the criteria that can be used to test for suitability – not leave these decisions in the hands of the private companies who have a financial stake in the final decision.

In short, the third/fourth industrial revolution doesn't just involve neutral digital technology. It has the potential to enhance our democracy and at the same time contains the seeds of its destruction. I have highlighted some of the trends that appear more likely to result in the latter outcome. They are exacerbated by the challenges of globalisation and the dominance of neoliberal ideology. Every year, Freedom House compiles an authoritative report on the state of democracy around the world, using a range of criteria. Its most recent report claimed that in 2017 democracy faced its most serious crisis in decades as the fundamental conditions of free and fair elections, the rights of minorities, freedom of the press and the rule of law came under attack around the world. This is consistent with the slide over the last 12 years where 113 countries have shown a net decline in political rights and civil liberties, and only 62 have shown an improvement (Freedom House, 2018).

Australia continues to be one of the countries described in the Freedom House report as being 'free' and characterised by the elements of a healthy democracy. And yet each of the dangers to democracy highlighted in this section are also emerging in Australian society, and capable of doing harm to our polity (Camilleri, 2014). What is needed to prevent such damage from occurring?

Step 3b: What capacities for citizenship are needed to handle the impact of the third/fourth industrial revolution?

In the previous section I argued that the digital revolution is one of the factors that has contributed to the decline of key elements of democratic life. But I also maintain that the new technologies have the power to enhance democracy, provided that certain conditions are met. The central feature of a democratic recovery must be a knowledgeable and active citizenry with the capacity to use technological tools for the common good, rather than their own narrow self-interest. What are the capacities needed for such a democratic citizenry? The following suggestions are drawn from the analysis above.

- *Knowledge about democratic life:* If some of the fundamental tenets of democracy are under threat, the first step in overcoming the dangers is for the citizenry to understand what needs to be defended and why. This suggests that all citizens understand our democratic system, its origins, history, institutions, processes and values. This should not be a static understanding, but one that enables citizens to recognise how to improve democratic processes or institutions in ways which are consistent with the basic principles of democracy.
- *Capacities for civic and political engagement:* A number of capacities for civic and political engagement are needed if the dangers to democracy described in this section are to be avoided or overcome. These include capacities for:
 - *Discernment and scepticism* – if factors such as fake news and hyper-individualised targeting at elections are prevalent through social media, citizens need strategies to recognise and resist them (Susaria, 2018). This suggests that citizens should have the skills to be able to discern propaganda, identify the authority of any source, weigh up evidence, and be sceptical about claims.
 - *Engagement with different views and beliefs* – if social media is driving people into echo chambers where their own biases are confirmed, citizens in a democracy need the capacity and commitment to seek out alternative views and to engage in respectful discussion about them.
 - *Local and global thinking* – if global surveillance via big data, and the power of the big tech companies poses a threat to democracy at the local and global levels, citizens need to have the skills to recognise what is happening and work with others at a local and global level to devise and take action to effect change.

- *Reflection and action* – if the speed of the 24-hour news cycle is causing superficial consideration of disparate issues, then citizens need to develop strategies that allow them to discern big trends, reflect on them in depth, and take appropriate action.
- *Dispositions for civic and political engagement*: In the previous section I argued that various developments in the social media and the use of big data are contributing to a heightened sense of self-interest and individualism. Since a sense of society is important in a democracy, citizens must possess such dispositions as:
 - *A commitment to the common good* – if strategies such as hyper-personalised targeting at election time are based on appeals to self-interest, it is crucial that in a democracy citizens have an ability to recognise propaganda, and a commitment to thinking beyond themselves and considering benefits to the wider community – particularly those who are most disadvantaged in our society.
 - *Computational ethics* – if the development of AI raises a number of ethical issues and dilemmas, and the resolution of these will have long-lasting consequences, it is crucial that all citizens – not just a few researchers – have the capacities to understand the dilemmas and are equipped to consider the ethical dimensions of any mooted solutions.

Step 2c: The implications for individual, social and cultural life²

The digital revolution has had a remarkable impact on individuals and on the social and cultural life of many societies. Much of this impact has been positive – people have instant access to the world’s knowledge; can talk to family and friends at anytime and anywhere in the world; make financial transactions; purchase books, films and music; express ideas freely in a multitude of forums for debate and discussion; and much more.

Notwithstanding these many advantages, there are a number of emerging concerns about the adverse impact that the new technologies are having on individuals and society. However, just as I argued in the previous sections that the possible dystopian effects on work and democracy of the digital revolution can be minimised or excised by human action, so too does this apply to the possible effects on individual, social and cultural life. I will describe, in no particular order, a few of the issues that need to be addressed.

“Notwithstanding these many advantages, there are a number of emerging concerns about the adverse impact that the new technologies are having on individuals and society.”

One concern relates to the issue of data and privacy (Keen, 2018). Search engines and recommendation platforms now provide us with personalised suggestions for products and services based on our search history and our social interactions on places like Facebook and Instagram. Often the suggestions being offered match so closely to our choices, it is hard to detect that we are being manipulated. In fact, the

more information we unconsciously cede to search engines and social media platforms, the more we are being controlled as each of us becomes the target of hyper-individualised marketing. Many people say that this purported assistance can be quite helpful. However, when it begins to shape the nature and cost of a product or service we seek, it may become more sinister. Insurance companies, for example, are starting to use data from social media and other sources to assess an individual’s risk, and thus the cost of their insurance premiums (Boyd, 2017). The point is that as the Internet of Things expands, so too does the capacity to generate more and more data about each of us. It is becoming ever more urgent that our society debates the extent and limits of individual privacy, and how data can be protected from hacking.

Another pragmatic issue is the increasing awareness of the negative effects of social media use. These range from the growth of cyber bullying, which can leave its victims deeply psychologically scarred; to the fact that

² I have combined the individual and social and cultural purposes of education in this section owing to the overlap of implications for these arenas.

people feel always contactable and so can never break from work; to the growth of addictive behaviours where people experience withdrawal symptoms or anxiety when they are separated from their smartphone for even a few minutes. There is some evidence that social media platforms like Facebook, Twitter or Instagram can make people perceive themselves to be more socially isolated (Primack et al., 2017), and even cause depression as people unfavourably compare themselves with the life story of others. Others such as Anne Manne (2014) fear that the idea of ‘curating the self’ through social media, can lead to a narcissism incompatible with the notion of Rifkin’s collective commons.

Allied with the issue of privacy is the question of what the third/fourth industrial revolution is doing to our humanity. This sounds like a grand claim, so let me explain. We are now living in a society where even the everyday things we use – fridges, phones, toothbrushes, coffee machines, televisions and so on – are all equipped with communicating sensors that are generating data about us all the time. Some people use some of this information to help make decisions. For example, people can self-quantify by using various devices such as smart phones and Fitbits to monitor their moods, sleeping patterns, activity levels, heart rates, how much alcohol they drink and so on, for purposes of self-improvement. Most of us allow technology to make decisions for us, without thinking much about it. Thus the GPS in cars tells us where to drive to get to a particular destination, and algorithms make predictive decisions in many areas of human activity such as watching a movie, or buying books, music or a house – all based on the data that has been collected about our previous actions, choices and interests. In this way we are becoming inputs into a process as algorithms take on human responsibilities. Instead of humans programming computers, it is the computers who may program us. The danger is that over time humans will lose the capacity to make decisions and solve problems, thus ceding our autonomy to machines.

Yuval Harari (2016) argues that there are two trends coming out of Silicon Valley. The first he calls ‘dataism’, which involves information and algorithms eventually taking the place of our human instincts for the purposes of decision-making. The second he labels ‘techno-humanism’, where as humans we try to protect and lengthen human life by upgrading ourselves biologically. Harari cites such examples as nanorobots patrolling our blood stream looking for pathogens to destroy; or human brains being connected to the internet, or to other brains, to make an internet of minds. Both these trends may contribute to the development of a sort of super life form that is more techno-based than human – a new machine species. Although at the end of the second decade of the 21st century scenarios like these sound far-fetched, Harari argues that the digital revolution is proceeding at such a speed that within three decades the trends may be so advanced that they are irreversible. If humans want to maintain their autonomy and their humanity we need to recognise now what is possible and make decisions about how far we want AI to extend.

Walsh (2017b) is more optimistic, but agrees that humans must take control now. He argues that the AI revolution gives us the chance to rediscover the things that make us human. Thus, although machines may be able to produce amazing art and music, we will still prefer works that are produced by humans and speak to the human experience:

No machine will truly experience love like we do. As well as the artistic, there will be a re-appreciation of the artisan. Indeed, we see the beginnings of this already in hipster culture. We will appreciate more and more those things made by the human hand. Mass-produced goods made by machine will become cheap. But items made by hand will be rare and increasingly valuable. Finally as social animals, we will also increasingly appreciate and value social interactions with other humans. So the most important human traits will be our social and emotional intelligence, as well as our artistic and artisan skills. The irony is that our technological future will not be about technology but all about our humanity. (Walsh, 2017b)

The digital revolution will also have an impact on the cultural and social life of our society. I give two examples relating to the important diversity of Australian society. The first example highlights the hidden dangers of AI.

With machine learning, the ability of computer programs to interpret language has improved significantly. Machines can acquire human-like language abilities by interpreting the patterns contained in the vast amounts of online data they absorb. Researchers in England and the US have found that AI tools absorb the biases contained in these patterns, and exhibit significant racial and gender biases (Devlin, 2017; Eubanks, 2017; Noble 2018). On reflection, this is not surprising. Algorithms are mathematical models based on data constructed by humans, and so reflect all the prejudices that exist in our society. Cathy O’Neil (2016) calls them ‘weapons of math destruction’ that are ‘important, secret and destructive’ and which simply automate the status quo. O’Neil gives examples of an increasing number of decisions that are being taken by AI – such as who gets a job interview, a loan or parole – and that reinforce existing prejudices and social inequalities. Far from being objective and neutral, the algorithmic models in which we place so much trust are no more than ‘opinions embedded in mathematics’ (O’Neil, 2016).

The second example relates to the possibilities for social disruption. In the earlier section on the impact of the digital revolution on work, I described some of the less-work or no-work scenarios that are possible in the coming decades. Ryan Avent (2017) fears a society comprising a small number of highly paid workers, and a large number of unemployed or very poorly paid workers, as robots replace humans and productivity increases. Such a society, he argues, must consider policies based on redistribution like a universal basic wage and job sharing if there is not to be social dysfunction. However, he points out that redistributive policies like these inevitably exacerbate tensions between groups, heightening the suspicion of outsiders. Those with well-paid jobs who see themselves as the ‘makers’ are reluctant to subsidise the poor, including immigrants, who they see as the ‘takers’; and the poor are aggrieved by the growing gap between themselves and the rich, and the indignity of having to accept hand-outs.

These social fractures can be seen already in many countries around the world, as the industrialised economies of the second industrial revolution unravel, and those who lose their jobs begin to look for reasons, often blaming outsiders such as immigrants for their situation. People begin to turn to populist leaders who milk the grievances by providing simplistic explanations for the problems and make promises that are impossible to keep. In such an environment, the broad social consensus evaporates as society loses its tolerance of diversity, its sense of community, and its social wealth. In a number of countries, separatist and fiercely nationalist groups have already started to pull up the drawbridges and argue that social cohesion can only be achieved by excluding outsiders and reducing difference.

This scenario, even if only partly accurate, poses a huge threat to Australia’s successful multicultural society. It means that citizens must not only understand what may happen, but are committed to devising strategies for the new economic and social contexts based on a deep appreciation of the social and cultural benefits of diversity, and a commitment to the common good³.

“These social fractures can be seen already in many countries around the world, as the industrialised economies of the second industrial revolution unravel, and those who lose their jobs begin to look for reasons, often blaming outsiders such as immigrants for their situation.”

³ Where I use the term common good in the paper, I am using the meaning ascribed to it by Robert Reich: ‘*The common good consists of our shared values about what we owe one another as citizens who are bound together in the same society – the norms we voluntarily abide, and the ideals we seek to achieve....A concern for the common good – keeping the common good in mind – is a moral attitude. It recognises that we’re all in it together. If there is no common good, there is no society*’ (Reich, 2018, p. 18).

Step 3c: What are the implications of the impact of the third/fourth industrial revolution for individual, social and cultural capacities?

In the previous section I described some of the issues emerging from the third/fourth industrial revolution that are having adverse effects at the level of the individual and the society. Like the areas of work and democracy, these issues can only be dealt with by human action, and so require individuals with the capacities to understand what is happening, change their individual behaviour where necessary, and work with others to address the challenges to the wider society. The following suggestions about the nature of these capacities are drawn from the analysis above.

- *Knowledge for individual and cultural life:* If the technological developments of the third industrial revolution are raising significant ethical dilemmas related to privacy, human autonomy and agency, then individuals must have some foundational knowledge about these philosophical concepts in order to recognise the problems and work out strategies to deal with them. They also need a practical understanding about the basis of the technological developments that are challenging human freedoms. For example, people will need to be able to understand, and develop views about, concepts and ideas such as:
 - the relationship between the individual and society
 - individual freedom and human agency
 - the tension between a right to individual privacy and social action to protect groups in society
 - the balance between diversity and social cohesion
 - basic computational concepts and how they are employed in algorithms
 - how big data works and is used in our society.
- *Capacities for digital awareness:* If the new technologies of the digital revolution are creating the kinds of personal and social issues described in this section, then individuals will need to develop strategies to deal with such matters as:
 - recognising and dealing with cyber bullying, addictive technological behaviours and social isolation
 - ensuring that technology usefully augments our lives rather than ceding agency to it by meekly accepting the decisions made by algorithms
 - understanding that algorithms are based on human prejudices, and can be questioned or resisted
 - continuing to develop the skills and passions that make us human, such as art, making things by hand and music, and emotional intelligence.
- *Dispositions for ensuring that technological development serve the common good:* As described above, developments like AI have the potential to result in social dysfunction. If so, citizens will need to have dispositions that will help to ensure that the developments don't widen inequality and foster discrimination and mistrust between social, cultural, racial and ethnic groups. These dispositions will include empathy, compassion, caring and social justice.

Summary: The case study so far

At the end of Part B of this paper, I proposed a six-step process for exploring the educational implications of a major societal trend. I suggested that the reference point for the analysis should be the purposes of education, a detailed consideration of which has been a missing element in contemporary educational policy making. In Part C, I have used the concept of the third/fourth industrial revolution as a case study to model the first three steps of the process. Step 3 ended with suggestions for the kinds of knowledge, skills and capacities needed to handle the issues raised for individuals and society in the arenas of work, democratic, social and cultural life. The suggestions are not exhaustive and certainly need greater consideration, but they serve an illustrative purpose to demonstrate the process in action.

Whilst other sites such as the workplace, community groups or the family are also where knowledge and social capacities are developed, it is only in educational institutions like schools where they can be taught in a systematic way by people with expertise in the relevant content areas, and in the best ways to teach and assess learning. It is time therefore, to turn to the next three steps of the proposed process, which deal with the educational implications of the case study.

PART D: Step 4

What are the implications of the case study for curriculum and pedagogy?

The six-step process proposed in this paper is based on the assumption that if educational responses to the challenges of the future are to be appropriate, they must be based on a thorough understanding of those challenges. Guesswork won't do the job. Thus, the first three steps of the proposed six-step model quite deliberately steer clear of a detailed consideration of education. In Part C I modelled this by investigating the nature and impact of a key societal trend – the third/fourth industrial revolution.

In Steps 4–6, the time has come to explore the educational implications of what has been discovered in Part C. It doesn't mean assuming a tabula rasa and starting again, as often happens with reports on educational reform. Rather, it involves exploring the changes or modifications to current policy and practice that might be needed as a result of what the case study demonstrates⁴. Indeed, if the process was used regularly, it would inevitably mean tweaking rather than major surgery.

Nonetheless, any modifications need to be more systematic than simply listing some of the capacities that emerged from the case study and devising new policy to accommodate them. For a start it means looking at more than just one aspect of educational policy and practice, such as the official curriculum or teaching strategies. The weakness of having a single focus is that it fails to acknowledge that, since aspects of schooling are interdependent, change in one aspect may be contradicted by another. Thus, Step 4 investigates the implications for the official curriculum and pedagogy; Step 5 investigates systemic obstructions to change; and Step 6 looks at school and system culture. The key point is that there should be consistency between these various aspects of schooling.

What is involved in Step 4 and why?

Step 4 involves examining the implications of the case study for what is intended to be taught (the official curriculum) and how it is taught and assessed (pedagogy). However, since proposals for change often founder on the rock of entrenched practices, there is little point in attempting to change policy or practice without also considering the blockages to the changes and how these might be overcome. This will happen after the changes are identified.

Step 4a: What are the implications of the case study for the intended curriculum?

In Australia, the official (intended) curriculum is represented nationally in the compulsory years of schooling by the Australian Curriculum, and in the senior secondary years in the states and territories by separate certificates⁵. Each of these reflects a particular view about what is valued knowledge in our society, and is organised upon beliefs about child development and learning theories. Thus, identifying what knowledge the official curriculum should contain and how it should be constructed is a value-laden task that results in fierce debates. Although what is intended to be taught doesn't necessarily translate into what is enacted in the classroom, the official curriculum influences and constrains educators, and so it is an important aspect to consider.

⁴ For the practical purposes of the paper, I am using a single societal issue as a way to identify what aspects of current policy and practice might need to be modified, changed or confirmed. It would of course be possible to triangulate the findings of a single study by exploring other significant issues such as environmental challenges, population growth, or social inequalities.

⁵ In this section I will discuss the implications for curriculum, pedagogy and environment without reference to specific year levels. That is, the proposals that follow would apply both to the end of the compulsory years of schooling, and to the senior secondary years. However, they may be translated into practice differently depending on year level and jurisdiction.

What did the case study tell us, and what curriculum changes are suggested by it?

In Part C I examined the effects of the third/fourth industrial revolution on work, democracy, individuals, and social and cultural life. At the end of each of these sub-sections – in 3a, 3b, and 3c – I suggested a number of capacities people might need to engage successfully with the changes in each arena. If, as I have argued, it is the role of education to develop these capacities, then the next task is to put all the capacities together and try to discern patterns and common elements.

When the capacities are placed side by side, I found that I could group them under four kinds of interrelated knowledge categories: discipline-based learning, interdisciplinary learning, general capabilities, and meta-learning. Table 3 provides a summary of how these categories have been arrived at from the case study.

Table 3: What did the case study tell us?

Curriculum aspect	What did the case study show?	Examples from the case study
<i>Disciplinary learning</i>	The case study suggests a number of capacities that are about knowing facts, concepts and ideas, most of which are contained in the knowledge located in academic disciplines.	<p>Areas of knowledge suggested by the case study include:</p> <ul style="list-style-type: none"> - knowledge about our democratic system, its origins, history, processes and values - understanding key concepts such as the meaning of individual freedom, human agency, privacy, computation, big data, diversity and social cohesion.
<i>Interdisciplinary learning</i>	The case study provides a number of examples of the need for people to be able to grapple with contemporary issues, problems and dilemmas by moving across disciplinary boundaries in order to see the whole rather than its parts.	The case study provides many examples of tensions and dilemmas for democracy, work and social and cultural practices brought about by the third/fourth industrial revolution that can only be addressed by working across disciplinary silos.
<i>General capabilities</i>	The case study suggests a number of capabilities – skills, dispositions and values – that people need to meet the demands and challenges produced by the third/fourth industrial revolution.	<p>The capabilities suggested by the case study include:</p> <ul style="list-style-type: none"> - creative and critical thinking - innovation - ethical thinking and dispositions - thinking locally and globally - ICTs - discernment and scepticism - intercultural understanding - a disposition for the common good.
<i>Meta-learning</i>	The case study demonstrates that in an information society where knowledge is expanding at an exponential rate, it is important to be able to understand oneself as a learner and the process of learning, and have the ability to develop these understandings throughout life. It is wider than metacognition and so has been termed meta-learning.	<p>The case study shows that having the ability to reflect on one's strengths and weaknesses as a thinker and learner includes:</p> <ul style="list-style-type: none"> - strategies for thinking about thinking (metacognition) - understandings about one's own learning capacities - learning about learning, as well as learning to learn - a love of learning.

From a curriculum perspective, the key point is that each of the four components should not be seen in isolation but rather as connected parts of a coherent whole. That is, each curriculum component is reliant on a dynamic relationship with the other components. Thus:

- *Disciplinary learning*: Disciplines are the foundation blocks of knowledge in our society, and are therefore central to learning. School subjects/learning areas are selections from disciplines by educators who organise and sequence them on the basis of what is known about students. The other three curriculum components enrich the curriculum by working in and through the disciplines.
- *Interdisciplinary/multidisciplinary/transdisciplinary learning*⁶: Increasingly, new knowledge is generated through the synthesis of knowledge from different specialised disciplinary fields. Thus ways of understanding and dealing with societal issues and problems can only be achieved if the fundamental ‘unity of knowledge’ (Wilson, 1998) is appreciated, and people are able to work across disciplinary boundaries. Thus the capacity to combine disciplines (interdisciplinary), or draw from a number of disciplines (multidisciplinary), or blend disciplinary knowledge (transdisciplinary) is a fundamental capacity in the 21st century. As I will argue in the next section, interdisciplinary knowledge has a symbiotic relationship with disciplinary knowledge.
- *General capabilities*: There are a number of key skills, values and dispositions without which people could not function adequately in our society. In the Australian Curriculum these have been called general capabilities. They are keys to the enactment of disciplinary and interdisciplinary study, and to individual and social practice.
- *Meta-learning*: Meta-learning is the capacity to understand oneself as a learner and the process of learning. It goes beyond metacognition, taking in new understandings in fields as disparate as neuroscience and the functioning of the brain, emotional and social learning, cognitive psychology, and the link between physical movement and learning. It is fundamental in an information/knowledge society where knowledge is expanding at an exponential rate, and where technology is causing us to ask questions about what aspects of our humanity we want to retain rather than cede to machines. That is, if learning is a key to living in the 21st century, and to preserving our humanity, then understanding the many aspects of learning is crucial. In curriculum terms, meta-learning involves deep reflections on learning as students work with disciplinary, interdisciplinary and capability-based knowledges.

In summary, from the perspective of the case study, these four broad curriculum components – disciplinary learning, interdisciplinary learning, general capabilities, and meta-learning – are the key elements of a contemporary curriculum. Importantly, the four components cannot be seen or developed in isolation – the deep essence of each can only be fully realised when it is in a dynamic relationship with the other components. As flagged in the Executive Summary, Diagram 2 tries to capture the synergy derived from this interrelatedness.

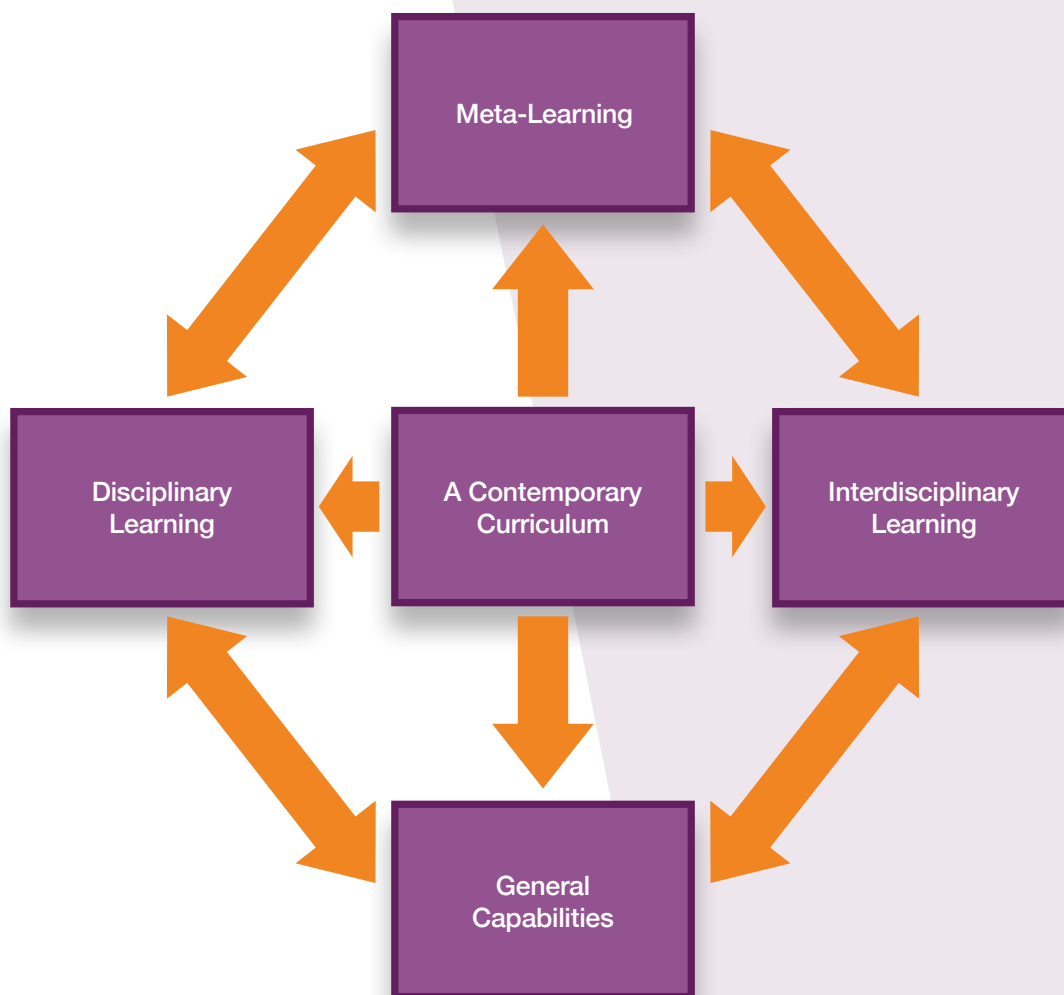
To what extent are these curriculum components represented in the Australian Curriculum, which covers the compulsory years of schooling, and in the state-based senior secondary official curricula? The good news is that aspects of each component are present. However, on the basis of what the case study reveals, there are some significant gaps, not only within the components, but in the lack of interrelatedness between them. Thus, using the Australian Curriculum as an example:

- *Disciplinary learning*, as represented through the learning areas and subjects, is the most prominent of the components. There are always ways in which these can be improved (see Reid & Price, 2018), but they are generally well regarded by the various subject professional associations.

⁶ From this point I will use the single term interdisciplinary to convey the general aims of these cross-disciplinary forms of investigation.

- *Interdisciplinary learning* is weakly represented in the official curriculum. The three cross-curriculum priorities are important⁷, but they represent just one element of interdisciplinary learning. Although ACARA would claim that interdisciplinary study is always possible with a discipline-based curriculum, the reality is that it is not easy for teachers to organise the curriculum this way without significant support. For example, there is no mechanism in the Australian Curriculum to signal where an interdisciplinary approach might be used, nor are there resources to assist teachers to develop such approaches.
- *General capabilities* are certainly present in the Australian Curriculum, and to a lesser extent in senior secondary curricula around Australia. The problem is that they tend to exist more in name than in practice, and they are often treated in isolation from the learning areas.
- *Meta-learning* is present, but usually in a diluted form. For example, in the Australian Curriculum, metacognition – which is a key aspect of meta-learning but not the only one – is named only as one of a number of aspects of the ‘critical and creative thinking’ general capability. I argue that the time has come to recognise the broader concept of meta-learning as a separate and key component of the official curriculum.

Diagram 2: The dynamic relationship between key components of the contemporary official curriculum



In summary, the four curriculum components are present in most official curricula in Australia. However, the components exist mainly in isolation, and three of them – interdisciplinary learning, general capabilities and meta-learning – are each seriously underdeveloped. That is, the case study has alerted us to some significant shortcomings with current curriculum approaches. What should be done?

⁷ The three cross-curriculum priorities are Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia’s engagement with Asia, and Sustainability.

Given that the four curriculum components already exist, albeit in an emaciated form, the first step is to identify the problems that are holding them back. In other words, what are the embedded blockages hindering the development of a well-theorised model of the official curriculum comprising all four aspects in a dynamic relationship? I will deal with four major blockages.

Recommendation 5:

That ASPA considers the capacities identified in the case study in this paper, and arrive at what it considers to be the key components of a contemporary curriculum. Such an agreement would inform ASPA's stance towards national curriculum issues.

What are the blockages to change?

Blockage 1: The binary of disciplinary and interdisciplinary knowledge

A key blockage to keeping the four elements of the curriculum in productive tension is the singular dominance of the disciplines in the public debate and in the Australian Curriculum. The case study demonstrates that having the capacity to think and work across disciplinary boundaries is fundamental in the 21st century, if people are to understand and participate in addressing social, political, cultural and environmental problems. And yet any proposal to introduce the idea of interdisciplinary learning is rejected by those who hold that attempts to integrate the established disciplines will dumb down the curriculum. This view is summarised by the Victorian opposition spokesperson for education, Tim Smith, who argues that:

Parents expect a rigorous and knowledge-based curriculum [that] should reflect ideas and traditions that have stood the test of time. It should conserve and pass on our shared cultural inheritance. It should distil what the generations that came before us deemed worth knowing.
(Smith, 2018, p. 14)

According to Smith and many other conservative commentators, unless the curriculum comprises disciplinary-based knowledge about our shared cultural heritage, it is not rigorous. His argument, which resides firmly within the revert camp described in Part A, makes a fundamental error: it assumes that those arguing for an interdisciplinary approach are antagonistic to disciplinary-based knowledge. Such an argument draws a false binary between discipline-based and interdisciplinary-based study. In fact, the relationship between these knowledge forms is symbiotic: interdisciplinary work cannot be achieved without the existence of the disciplines, and disciplinary study is sterile if key disciplinary concepts from different disciplines are not combined in the service of addressing key societal issues. A central curriculum question is when and how to study disciplinary-based knowledge in isolation, and when and how to combine the knowledge across disciplines to understand big issues, problems and dilemmas.

A singular discipline-based approach fails to grapple with the application of knowledge. Thus the knowledge, skills and dispositions identified in Part C demand an ability to understand an issue holistically and a capacity to integrate key concepts drawn from a number of learning areas. Disciplinary silos are a necessary but insufficient means to face up to the challenges of the 21st century. As Fadel et al. (2015) argue, more innovative knowledge maps and an understanding of the interrelatedness of knowledge are needed for deep learning.

“A central curriculum question is when and how to study disciplinary-based knowledge in isolation, and when and how to combine the knowledge across disciplines to understand big issues, problems and dilemmas.”

“The problem is that the same-curriculum-for-all approach ignores the extent to which the selected valued knowledge of the official curriculum is socially and culturally bound, and reflects the values and interests of the groups that design it.”

The simplistic binary thinking, which assumes that introducing students to interdisciplinary knowledge is to downgrade the importance of disciplinary knowledge, is a stumbling block to creating a contemporary curriculum. It has prevailed for too long in the public arena, and needs to be challenged. ASPA could lead the public debate by showcasing some of the dynamic interdisciplinary work in which students in many secondary schools around the country are engaged, and demonstrating how such work both confirms, consolidates and builds on the disciplines. This could be done not only through printed and online resources, but also through community exhibitions and workshops.

In addition, more assistance with approaches to interdisciplinary programs could be provided to teachers. For example, the Australian Curriculum is organised around learning areas that select and sequence knowledge from specific disciplines. However, although ACARA claims that there is nothing to prevent interdisciplinary study, the reality is that there is no mechanism in the official curriculum to signal where an interdisciplinary approach might be used, nor are there resources to assist teachers to develop such approaches. An important task in the next phase of the Australian Curriculum is for ACARA to conduct a close examination of the ways in which interdisciplinary work can be facilitated through its learning areas.

Recommendation 6:

That ASPA, individually or in collaboration with other professional associations, showcases – through resources or community exhibitions – the interdisciplinary work that is currently taking place in schools around Australia, with particular emphasis being placed on the importance of discipline-based study to such work.

Recommendation 7:

That ASPA urges ACARA to examine how it might modify the Australian Curriculum to provide signals about where interdisciplinary study might be used at different points in the learning sequence. This could involve identifying possible connections and relationships within and between key concepts in various disciplines, and providing resources to support teachers and students in planning and implementing interdisciplinary study.

Blockage 2: The dominant understanding about how an official curriculum can cater for all students

Another blockage is the disputes about how educational disadvantage is best addressed in the official curriculum. The dominant view maintains that since disciplines comprise the best knowledge that has been produced by communities of specialist disciplinary researchers over time, then it is the ‘entitlement of all pupils’ (Young, 2014)⁸. That is, it is claimed that the disciplinary-based learning areas represent the ‘powerful knowledge’ of any society to which all students should have the same access. This is the view of the connection between equity and the curriculum upon which the Australian Curriculum is based.

The problem is that the same-curriculum-for-all approach ignores the extent to which the selected valued knowledge of the official curriculum is socially and culturally bound, and reflects the values and interests of

⁸ It is important to remember that school subjects/learning areas are not disciplines, they are selections of knowledge from disciplines that are organised and sequenced in the official curriculum.

the groups that design it. Many curriculum scholars argue that this official knowledge is the ‘knowledge of the powerful’, rather than ‘powerful knowledge’ because it favours those students who have the largest helpings of the dominant social and cultural capital (e.g. Apple, 1993, 2004). At the same time, it alienates students from educationally disadvantaged backgrounds whose lifeworld knowledge is not represented in the official curriculum. If all students are entitled to have access to society’s powerful knowledge, then a fundamental educational challenge today – made even more urgent by the kinds of issues outlined in the case study in Part C – is to involve students from educationally disadvantaged backgrounds in a curriculum that gives them access to powerful knowledge, but doesn’t marginalise their social and cultural knowledge.

Taking account of the culturally diverse knowledge of students from educationally disadvantaged backgrounds is not to ignore disciplinary knowledge, as is commonly claimed. The fact is that lifeworld knowledge can be powerfully connected to disciplinary knowledge, making the learning experience both more interesting and more meaningful to students. Zipin (2017) makes a cogent argument for what he calls a problematic-based curriculum approach, where students engage in projects exploring problematic conditions in their everyday lives, such as ecosystem damage or increasing youth unemployment, informed by disciplinary-based study. Far from marginalising disciplinary knowledge, such an approach contextualises it to produce more powerful learning. But if such approaches are to move into the mainstream they need research and resources; and they also need advocacy. As Brennan and Zipin (2018) argue:

Curriculum that includes ‘all’ – equivalently in terms of empowerment, but respectful of meaningful diversity within the empowered ‘all’ – cannot emerge if an assimilative ‘same’ is distributed to all. The trend toward a false ‘equity’ in the name of the ‘the same’ must be contested. (Brennan & Zipin, 2018, p. 186)

Put another way, redistribution of powerful knowledge is an impoverished social justice principle unless it is accompanied by both the ‘recognition’ of the community values and knowledges of diverse student groups, as well as the ‘representation’ of these groups in the decision-making processes that produce the official curriculum (Fraser, 2009). The Australian Curriculum is based on an inadequate understanding of equity that needs to be addressed urgently.

Recommendation 8:

That ASPA urges ACARA to consult about and develop a rigorous understanding of how equity is understood in the Australian Curriculum, and then amend the Australian Curriculum on the basis of the policy developed.

Recommendation 9:

That ASPA, in conjunction with university partners, applies for funds to develop and research an approach to curriculum that incorporates the lifeworld knowledge of students from educationally disadvantaged backgrounds.

Blockage 3: Undeveloped understandings about the nature, role and purposes of the general capabilities

One of the four aspects of a 21st century curriculum that emerged from the case study is a number of capabilities. These are skills, dispositions and values that people need to meet the demands and challenges produced by the third/fourth industrial revolution. In the Australian Curriculum they are known as general capabilities⁹. Some of those suggested by the case study, such as creative and critical thinking, ethical behaviour, and intercultural understanding are already represented in the Australian Curriculum; whilst others, such as the ability to be discerning and sceptical and to have a disposition for the common good, might be considered in the future. Given the importance of the general capabilities to 21st century learning, adding to or modifying them should be a regular process based on the kind of analysis of contemporary societal trends suggested in this paper. For example, consideration about whether or not the current list of

⁹ There are seven general capabilities in the Australian Curriculum: literacy; numeracy; information and communication technology capability; critical and creative thinking; personal and social capability; ethical understanding; and intercultural understanding.

general capabilities is still fit for purpose could be part of the process when the national goals of schooling are developed each decade.

It is pleasing to note that the Gonski report (2018, pp. 38–40) argues that the general capabilities should be taken seriously; and that it is important to move beyond the approach of ‘naming them and hoping’ that they will be incorporated into teaching and assessment across education systems (Reid, 2006). However, the report’s discussion about the ways in which the status of the general capabilities can be raised in the curriculum through professional development and the provision of resources, ignores the issues that have impeded their take-up. Thus, the report jumps from an identification of the problem of lack of take-up, to its solution – without exploring the reasons for the problem. This led to Recommendation 7 – to strengthen the general capabilities through developing ‘learning progressions’ (Gonski, 2018, p. 41) – a recommendation that can only diminish, if not destroy, the power and potential of the general capabilities. I will explain this claim by reference to some of the current blockages.

There are at least two important conceptual issues that must be addressed if the potential of the general capabilities is to be realised. The first issue relates to understanding the ontology of capabilities and their purposes in the curriculum. There is a widely held but misguided view that the idea of capabilities somehow signals the end of a discipline-based curriculum. From England, Daisy Christodolou asserts that ‘... the movement for twenty-first century skills is a codeword for removing knowledge from the curriculum’ (2014, p. 52). And in Australia, as soon as the Gonski report was released, some commentators attacked it on the basis that strengthening the general capabilities meant abandoning the disciplines (e.g. Ashman, 2018; Donnelly, 2018b). But the argument that knowledge and capabilities cannot coexist is to establish a false dichotomy – a problem that can only be addressed by clarifying the ontology and purpose of capabilities.

“...the argument that knowledge and capabilities cannot coexist is to establish a false dichotomy...”

In my view, the overarching purpose of the capabilities is to develop skills and dispositions that, in concert with disciplinary and interdisciplinary knowledge, enable individuals to act in and on the world through creating knowledge, making decisions, taking action, and assuming responsibility (e.g. Walker & Unterhalter, 2007). In other words, the capabilities are part of a package. They provide the glue for a 21st century curriculum by contributing the kinds of generic skills and dispositions that enable disciplinary and interdisciplinary knowledge to be used in the world. In other words, capabilities cannot exist or be taught in a vacuum, they can ONLY be taught through a relationship with knowledge.

The reason that capabilities are identified and named separately from learning areas is to ensure that their development is not a haphazard or hit and miss affair. It means that educators can ensure that capabilities are systematically developed across the curriculum with increasing levels of sophistication. Thus, agreeing on the purposes of capabilities will help to deflect the binary thinking holding back their role in the curriculum. At the same time, there is some important explanatory work needed in the education and wider communities. This could be achieved by ACARA producing and disseminating an accessible resource that clarifies the relationship between disciplinary/interdisciplinary knowledge and capabilities. Until such work is done, proposals about developing the general capabilities will continue to meet opposition based on a false premise.

The second conceptual matter relates to the *meaning* of each of the specific general capabilities. ACARA has made an effort to describe and sequence a continua of each of the seven general capabilities across the levels of the Australian Curriculum for each learning area (ACARA, 2018). The Gonski 2.0 report (2018) has taken this approach much further, recommending that a number of progression levels for each capability be developed. Unfortunately, breaking each capability up into a number of small pieces can only diminish

“...breaking each capability up into a number of small pieces can only diminish their potential to be used holistically.”

“...there are three common creative processes across many fields of endeavour: bending (changing shape), breaking (taking apart and reassembling) and blending (combining).”

their potential to be used holistically. That is, whilst it is important for educators to decide how to increase the sophistication of capabilities across year levels, atomising them through many progression levels is to lose their essence. A more productive approach would be to conduct a professional conversation about the meaning of each capability, informed by the latest research and writing. Such a conversation would enable educators to hold a coherent picture of the whole, even while they focus on aspects of a specific capability.

I will take the example of the capability *critical and creative thinking* to demonstrate this point. There have been many books and articles written about the nature of creativity and critical thinking (e.g. Brandt & Eagleman, 2017; Sternberg, 2003). Each provide intriguing insights into the nature of creativity, and its relationship to critical thinking. Some suggest that creative and critical thinking are complementary, others that they are very different entities and that it is unhelpful to combine them in the way the Australian Curriculum has done. Some provide fascinating insights into ideas for teaching for both. For example, a recent book (Brandt & Eagleman, 2017) on creativity explores what is happening in the brain when people are being creative and suggests, on the basis of analysing hundreds of instances of creativity, that there are three common creative processes across many fields of endeavour: bending (changing shape), breaking (taking apart and reassembling) and blending (combining).

Such studies deepen our understanding of the capability creativity, and at the same time spark ideas about relevant, appropriate and interesting learning activities across all learning areas. Thus, deeper, research-informed discussions across learning areas about the meaning of each general capability would enhance the possibility of developing a consistent, whole-of-school approach to teaching them; and would enable each capability to be taught as a coherent whole, rather than broken into dozens of pieces.

Apart from the lack of conceptual clarity that is blocking the potential of the capabilities from being realised, there are some important practical matters. Developing the general capabilities through the learning areas is easier said than done. It requires teachers to identify what role their learning area might have in the development of specific capabilities, and share this across learning areas so that there is a consistent and coherent school-wide approach. It also means paying attention to the question of whether capabilities should be assessed separately or in conjunction with content knowledge, or both; and how capability development can be reported on through mechanisms like portfolios.

If the capability agenda is to advance – as the case study in Part C suggests it must – teachers will need support in the form of professional development and resources. It is pleasing that the Gonski 2.0 report (2018) recommends this, but disappointing that it hasn't recognised the need to grapple with the kind of prior conceptual questions described in this section before proposing methods of support.

Not to do so has caused it to fall into the trap of proposing progression levels, which are a technocratic, lock-step approach to the general capabilities that can only stunt their transformative potential. It is to be hoped that the Education Council will reject Recommendation 7 of the Gonski 2.0 report (Gonski, 2018, p. 41), and instead opt to conduct some trials across Australia of approaches to teaching for, and assessing and reporting on, the general capabilities in ways that capture the transformative spirit and purpose of the capability approach.

Recommendation 10:

That ASPA suggests to the Education Council that the process for developing the national Goals of Schooling each decade should include adding to or modifying the extant list of general capabilities.

Recommendation 11:

That ASPA urges ACARA to develop a resource that describes the conceptual basis of the general capabilities including their purposes, relationship to the learning areas, and role in the curriculum.

Recommendation 12:

That ASPA urges ACARA to commission a project that tracks what is happening with the general capabilities in Australian secondary schools; identifies problems and possibilities; and proposes what might be done to advance the teaching for, and assessment of, general capabilities.

Recommendation 13:

That ASPA or its state-based affiliates conducts a conference which focuses on one of the general capabilities, explores what it means, shares what is happening in secondary schools in teaching and assessing for it, and identifies what further support is needed to advance the capability agenda.

Recommendation 14:

That ASPA urges the Education Council to accept the spirit of Recommendation 7 of the Gonski 2.0 report, but rejects adopting the recommended single 'progression levels' approach, and instead supports trials of different approaches to teaching, assessing and reporting on the general capabilities.

Blockage 4: The fragmented approach to understanding learning and the predilection for silver bullets

If the case study shows anything, it is that in the 21st century people must have the capacity to learn, transfer knowledge to different contexts, relearn on the basis of new knowledge or experience, and keep on learning. However, there is little point in talking about the need for people to be lifelong learners if they don't have the capacity to learn new things in new contexts. The speed of knowledge production makes an understanding of the processes of learning the sine qua non of the future.

For some time now, there has been general agreement amongst educators that learning to learn is fundamental to the knowledge society. And yet there hasn't been a strong focus on clarifying the concept. Indeed, as Gert Biesta (2016) argues, learning has become a catch-all term for education, emptied of meaning because it seldom relates to what is learned and the purpose of learning. Since it is based on the purposes of education, the process proposed in this paper has cleared that obstacle, but in so doing has laid bare the need for deeper understandings of learning.

“...learning has become a catch-all term for education, emptied of meaning because it seldom relates to what is learned and the purpose of learning.”

Of course there have been some serious efforts to grapple with the concept of learning to learn. For example, the Australian Curriculum includes metacognition in the critical and creative thinking capability, describing it in the following way:

Students think about thinking (metacognition), reflect on actions and processes, and transfer knowledge into new contexts to create alternatives or open up possibilities. They apply knowledge gained in one context to clarify another. In developing and acting with critical and creative thinking, students:

- *think about thinking (metacognition)*
- *reflect on processes*
- *transfer knowledge into new contexts. (ACARA, 2018)*

However, although this approach does some of the work needed, if an understanding of learning is as central as the case study suggests, then it needs to be expanded beyond its current position as a small part of one of seven capabilities and become one of the key curriculum components. In so doing, account should be taken of some of the most recent insights into cognition. For these reasons, I am proposing that a focus on *learning to learn* be elevated to become one of the four central components of the official curriculum, and be named *meta-learning*.

One of the earliest users of the term meta-learning was the Australian John Biggs, who described it as a state of being aware of, and taking control of, one's learning, including the learner's conceptions of learning, epistemological beliefs, and learning processes and skills (Biggs, 1985). According to him, the meta-learner is able to evaluate the effectiveness of their learning approaches, and regulate them for the learning activity. Of course Biggs was writing more than 30 years ago, and so his understanding of meta-learning did not take into account some of the developments in learning that have occurred over that time.

More recently, Charles Fadel and colleagues (2015) resurrected the concept of meta-learning, arguing that it should be one of the central pillars of a 21st century curriculum. They proposed expanding 'metacognition' by adding the idea of 'growth mindset' – a concept developed by the psychologist Carol Dweck (2016) about the importance of beliefs about one's capacities to learn. However, this new version of meta-learning omits a number of important elements of learning, and needs further extension.

In the past few years, there have been some significant advances in such areas as cognitive psychology, with new insights into metacognition, cognitive neuroscience and research into the links between the functioning of the brain and learning, and the collapse of Freud's division of brain and mind (Hardiman, 2017). In addition, the role of emotions in learning, sensory learning, the relationship between learning and physical movement, epistemological beliefs and learning, interpersonal and intrapersonal learning and play-based learning are extending our understandings about learning. These and other areas of research demonstrate that an understanding of the processes of learning involves a range of aspects such as the social, emotional, physical and sensory, which go beyond a focus on metacognition.

In my view an important future project for education is to combine the insights from these various fields into a coherent program designed to teach students to understand processes of learning in particular contexts and for particular purposes. Given that researchers are just starting to scratch the surface of understandings about the brain, it would need to be a tentative and ongoing project. It would require collaboration between researchers who represent a number of the research fields that look at different aspects of learning, and educators with a knowledge of pedagogy and curriculum design. The developed program – which would focus on teaching students to understand, develop, monitor, regulate and evaluate approaches to learning – would span the year levels of schooling and connect to the other three components of the curriculum, and be continuously updated as new research comes in.

Such a project would have to surmount a number of barriers. The biggest of these is the predilection for education systems to grab the latest passing fad, and promote it as the silver bullet. For example, springing from one or more of the learning research fields listed above, are educational programs and approaches such as mindfulness, growth mindset, brain-based learning, and multiple intelligences. Based on empirical research, each approach claims that it will boost learning and leave students with a lifelong capacity to learn new things in new contexts. Often the approaches are well packaged and marketed, and taken up with enthusiasm, if not zeal, by educators who are looking for ways to enhance student learning.

However, all is not as it seems. The speed with which these programs are adopted often leads to problems. Sometimes there is unease about the efficacy of the approaches themselves and the research upon which they are based; and sometimes the developers of the idea itself become concerned about the approach being oversimplified, or distorted beyond recognition. I will use the well-known mindset theory as an example.

Carol Dweck's mindset theory was developed from her research in cognitive psychology and, over the past 20 years, has become one of the most popular and well-known approaches in education (Dweck 2016). Based on the idea that intelligence is not fixed but can grow through effort and perseverance, Dweck's views have spread across the world through professional development programs, conferences and packaged resources. Many education systems have urged teachers to adopt growth-mindset approaches.

The problem is that the missionary zeal with which the idea has been embraced has masked some basic issues. A key concern is the questions being asked about the mindset research itself, with some researchers casting doubt about the methodology and the statistics that were used to produce the findings, and others claiming that the results have not been replicated in similar studies. Some researchers, like John Hattie, ask whether a growth mindset is needed for all tasks, or whether it might not be more desirable to have a fixed mindset in some circumstances (Hazell, 2017). A further concern is that the idea allows deep-seated structural factors such as poverty, socio-economic status and ethnicity to be ignored simply by blaming students or teachers for not having growth mindsets. This academic debate will continue as the idea is tested for its rigour.

“The biggest of these is the predilection for education systems to grab the latest passing fad, and promote it as the silver bullet.”

However, there is also a practical problem related to mindset theory in use, with claims that many teachers have oversimplified the idea. Carol Dweck herself is worried about this, saying that some teachers are adopting what she calls a ‘false mindset’:

Often when we see kids who aren't learning well, we might feel frustrated or defensive, thinking it reflects on us as educators. It's often tempting to not feel it is our fault. So we might say the child has a fixed mindset, without understanding instead that, as educators, it is our responsibility to create a context in which a growth mindset can flourish.

Yes, another misunderstanding [of growth mindset] that might apply to lower-achieving children is the oversimplification of growth mindset into just [being about] effort. Teachers were just praising effort that was not effective, saying 'Wow, you tried really hard!' But students know that if they didn't make progress and you're praising them, it's a consolation prize. They also know you think they can't do any better. So this kind of growth-mindset idea was misappropriated to try to make kids feel good when they were not achieving. (Dweck in Gross-Loh, 2016)

Indeed, Dweck is so concerned about what she sees as misuse of her work, that she has republished her original book, and included a new section on ‘false mindset’ (Dweck, 2016).

“...it does provide a salutary lesson about picking up the latest idea as a silver bullet, and running with it, rather than placing the idea within a broader theoretical framework, rigorously checking out the research, and engaging teachers in ongoing professional development.”

None of this is to denigrate the concept of mindset, or those who are using it. Similar stories could be told about educational programs based on mindfulness, or multiple intelligences or the use of brain-based theory – each of which promises much but is also the subject of considerable criticism. But it does provide a salutary lesson about picking up the latest idea as a silver bullet, and running with it, rather than placing the idea within a broader theoretical framework, rigorously checking out the research, and engaging teachers in ongoing professional development.

Based on this experience, if the idea of meta-learning has some merit, then there are some important tasks to be undertaken before it can be introduced. These include doing a synthesis of the latest research about meta-learning, and turning this into a holistic framework spanning its various cognitive, emotional, physical, sensory and epistemological dimensions. Given the current stage of development, such work would need to be ongoing with the framework amended as knowledge expands.

One way to avoid the silver-bullet syndrome that has plagued some of the earlier simplistic attempts to translate the results of brain research into pedagogical proposals, would be to have educators working with researchers in other fields, and in other projects. An example of the latter is the Australian Brain Initiative, which includes an aim to ‘harness the plasticity of the brain to improve teaching and learning outcomes’, and to ‘transform the way we teach and learn’ (Australian Brain Alliance Steering Committee, 2016). Clearly educators need to get in on the ground floor of such projects, not only to provide educational expertise to them, but also to add to the sum of professional knowledge about learning.

Recommendation 15:

That ASPA advocates for a research project to develop a coherent meta learning framework and associated resources. This should involve collaboration between researchers representing the spread of research into various aspects of learning, and educators with a knowledge of pedagogy and curriculum design.

Table 4 provides a summary of implications for the curriculum.

Table 4: Summary of implications for the intended curriculum

Sub-questions	Aspect: Curriculum
<i>What did the case study tell us, and what curriculum changes are suggested by it?</i>	There are four components to a 21st century curriculum (Rec. 5): <ul style="list-style-type: none"> - Disciplinary knowledge - Interdisciplinary capacities - Capabilities - Meta-learning
<i>What are some blockages to change happening?</i>	<ul style="list-style-type: none"> - The binary of disciplinary and interdisciplinary knowledge (see Recs. 6 & 7) - Disputes about how an official curriculum can cater for all students (see Recs. 8 & 9) - Disputes about the nature, role and purposes of the general capabilities (see Recs. 10–14) - The fragmented approach to understanding learning and the predilection for silver bullets (see Rec. 15)

Step 4b: What are the implications for pedagogy?

The second aspect of Step 4 involves looking at the implications for pedagogy¹⁰. Obviously the case study doesn't specify the teaching approaches to use, but it does suggest the kinds of learning outcomes that should guide their choice. Such outcomes include developing people who are able to learn both independently and collaboratively, who are open-minded and critical thinkers with the capacity to transfer knowledge and apply their skills to different contexts, who understand the processes of learning and the strengths or weaknesses they bring to them, and who have a disposition for the common good. The challenge for all educators is to select teaching approaches that nurture these outcomes. The approaches must be flexible to suit a range of contexts, and be able to cater for individual as well as collaborative group learning. So, what do contemporary pedagogies look like?

I propose that the key to pedagogies, now and in the future, is held by teachers who come to a learning situation with a tool kit of teaching approaches from which they will select – often in conjunction with students – a teaching and assessment approach. That approach will be one they believe best suits the purpose of the topic or program; the context of the study; student – individual and group – interests, readiness and needs; and the resources available. Now this may sound like an obvious proposal, but I will argue that much of the contemporary debate about teaching assumes there to be just one teaching approach or a limited range of them; or offers a disparate set of variables that are claimed to promote best practice no matter the context or situation.

Put another way, I am arguing that pedagogies of the future hinge on the development of a framework for teaching that enables teachers to use their professional knowledge by selecting approaches appropriate to the students in their care. Such a framework should not be imposed or set in stone, but refined and improved through practice, research and professional conversations. In this way, teachers would genuinely be curriculum and learning designers, rather than technicians implementing an imposed pedagogy organised through, say, online generic resources designed by technology companies.


In order to illustrate this idea, I have constructed a possible framework, represented in Table 5, containing a number of elements described below. The idea is that the teacher(s) will move across the columns, broadly from left to right, piecing together an approach to teaching a particular aspect of the official curriculum such as a concept, theme or topic, for a particular group of students.

¹⁰ I understand pedagogy in this section to mean the theory and practice of teaching in order to influence student learning. It includes approaches to teaching as well as the environment in which teaching occurs.

The selection will be informed by teaching principles, which sit atop the framework. The principles I am suggesting include that the pedagogy will be inclusive, rigorous, personalised, relevant, collaborative and engaging; enable knowledge integration; and promote higher order thinking and deep understanding. It is important to note that the framework is posited on the understanding that learning is both an individual and a social process.

Table 5: A Framework for Teaching and Learning

Principles of teaching: e.g. inclusive, rigorous, personalised, relevant, collaborative, engaging, knowledge integration, promote higher order thinking and deep understanding

Orientation: (based on views of learning)	Teaching Approaches and Models	Teaching Strategies	Assessment		Class Organisation
<p>Student-centred</p>  <p>Teacher-centred</p>	<p>Process approaches</p> <p>e.g.</p> <ul style="list-style-type: none"> • inquiry-based • problem-solving • negotiated • controversial social issues • concept attainment • play-based <p>Directive approaches</p> <p>e.g.</p> <ul style="list-style-type: none"> • explicit / transmission • demonstration • direct instruction • mastery learning 	<p>Examples:</p> <ul style="list-style-type: none"> • role play • teacher exposition • group work • project-based • debates • performances • field work • use of ICT • flipped classroom 	<p>Reference</p> <p>e.g.</p> <ul style="list-style-type: none"> • self • standard • criterion • norm 	<p>Technique</p> <p>e.g.</p> <ul style="list-style-type: none"> • portfolios • tests • essays • multiple choice 	<p>Examples:</p> <ul style="list-style-type: none"> • across year levels (small or large groups depending on purpose) • classes organised in <i>group formation</i> • year level classes in <i>formal class structure</i>



Classroom and school environment:

e.g. respectful relationships, trust, democratic, appreciation of diversity, equity, intolerance of discrimination and bullying.

Alan Reid
2018

At the foot of the framework are a list of the values and practices that are established and nurtured in the classroom and school environment. These have been separated out because, unlike much of the teaching framework, they are not a matter of choice, but are developed and practised in an ongoing way. The examples I have listed are ones that are suggested by the case study and are consistent with beliefs about the purposes of education. They include respectful relationships, trust, democratic practices, an appreciation of diversity, equity, and an intolerance of discrimination and bullying. Given the power of the hidden curriculum, these cultural values should be transparent and worked on continuously.

In the framework itself, the first column covers the broad learning philosophy that underpins the teaching and assessment approaches represented in the next four columns to the right. Thus:

View of learning/orientation: Clearly any pedagogy is based, consciously or sub-consciously, on a view about how people learn best in particular situations. It is on the basis of this view that teachers make decisions about how the teaching will be conducted, including the role of the teacher. For example, two of the most well-known theories of learning are instructivism and constructivism. The former is teacher-centred with the teacher devising strategies to convey knowledge to students; and the latter more student-centred, with students actively constructing their own knowledge by connecting new ideas to existing ideas, with the teacher as a facilitator of learning. Despite claims by some commentators that to adopt one view of learning is to reject the other (e.g. Donnelly, 2018c), this framework suggests that different learning theories can be used at different times, with the selection dependent on the purpose and context of the learning and the stage of readiness of the learners. This is not to say that there should not be a particular emphasis – indeed the case study shows the importance of student-centred approaches – but that it is not inconsistent with, for example, combining some directive teaching for a specific purpose with a largely student-centred approach.

Teaching approaches and models: Once the general learning orientation has been determined, the next step is to decide on the model of teaching to be used, which will be consistent with the orientation and the

purpose of the topic being studied. At the teacher-centred end of the continuum are more directive approaches that include behaviourist models such as direct instruction and mastery learning, and directive models such as explicit teaching. Common to all of them is a process of presenting content, getting students to internalise the content through activities, and then assessing to check for understanding (I do, we do, you do). At the student-centred end are process approaches to teaching (Joyce et al., 2017). These include information process models such as concept attainment or inquiry; personal models such as negotiated/co-design models of project-based learning; or social models such as the controversial social issues model. The selection of the model will depend on the purpose of the topic being studied. Common to each of the process models is an intention that students develop metacognitive understandings about how to use the process in a different setting, as well as gaining content knowledge¹¹.

Teaching strategies: Once teachers have decided on the model of teaching, the next step is to plan the teaching strategies to be employed during the steps of the model. These are not tied to any particular orientation and include such standard practices as role play, group work and debates, through to more recent possibilities enabled through ICTs, such as flipped learning and online investigations. The way in which each strategy is used depends on the model of teaching being used.

Assessment: Teachers will then determine the approach to assessment. This will be influenced by the purpose of the assessment – for example whether it is formative, summative or diagnostic – and by the teaching orientation. The other important consideration is the reference point against which assessment judgements are to be made, spanning such approaches as criterion-, standards-, self- or norm-referenced assessments; and using a range of techniques (e.g. tests, essays, performance, portfolios, multiple-choice, online) and feedback mechanisms (e.g. marks, grades, descriptions).

¹¹ The use of teaching models like this might be a way of grounding some of the pedagogical frameworks like 'deep learning' (Fullan et al., 2018), which emphasise student agency, collaboration, and structured learning tasks, but tend not to use many of the well-developed models of teaching that exist.

Organisation: A key practical consideration is the organisation of the school and classrooms. The dominant organisational model is year level-based classes, although within this model there are many practices depending on the orientation. For example, teacher-centred classes are more likely to have a formal classroom seating structure, while student-centred approaches lend themselves to more flexible group-based arrangements. The advent of new technologies has led to practices which break the traditional model, with students sometimes organised into large groups, or working individually online, or spending time in the community or in the school's outdoor environment, depending on the particular purposes of the teaching. Increasingly the year level model is breaking down with students being grouped variously across traditional year levels depending on progress and interests.

“...a framework like this could be the basis of an ongoing professional conversation about teaching and learning, not only for professional development purposes, but also to establish some agreed understandings across the profession about the meaning of key pedagogical concepts.”

Some advantages of the proposed framework

It is important to note that the framework is not exhaustive or complete. Its main purpose here has been to make four key points. First, it demonstrates the serious limitations of the current debates about teaching quality and standards. There has been a tendency to assume that decisions about pedagogy are an either/or proposition. Take for example the recent pronouncement by Kevin Donnelly in the *Weekend Australian* that:

... Australian students have suffered as a result of a constructivist approach to education, which favoured student-centred learning in a democratic interactive environment over explicit teaching and firm discipline ... we need a greater focus on more effective pedagogy and what happens in the classroom. Teachers need to be in control. (Urban, 2018, p. 7)

Assertions like this not only misrepresent the approaches they counterpose, but incorrectly assume there is one fixed best approach to teaching. By contrast, the framework demonstrates that pedagogies of the future depend on teachers selecting an approach, from a tool kit of approaches, which best suits the purpose of the topic or program, the context of the study, and students' interests, readiness and needs. At times this may be a student-centred teaching model, at other times it could involve explicit teaching. By widening the pedagogical options for teachers, the framework will contribute to deepening student learning.

Second, the framework demonstrates that pedagogical work is theoretical as well as practical, and that it is important to have a sound and consistent theoretical basis upon which to plan teaching approaches. The case study suggests that giving students agency and encouraging them to develop as independent as well as collaborative learners means building learning skills slowly and methodically during their time at school. It enables teachers to decide when students are ready to move to a more student-centred approach, whilst still allowing for teacher instruction when needed.

Third, a framework like this could be the basis of an ongoing professional conversation about teaching and learning, not only for professional development purposes, but also to establish some agreed understandings across the profession about the meaning of key pedagogical concepts. It is on the basis of these discussions, as well as the outcomes of evaluation of practice and research, that the framework could be developed and refined. In this way it would be owned by the profession.

Fourth, the framework shows how new technologies can be used to expand the range of teaching strategies, without assuming that the presence of a new technology is itself a different approach to teaching. Virtual reality headsets, flipped classrooms and Chromebooks can be just as teacher-centred as traditional instructive approaches. However, the new technologies can extend the reach and scope of learning and so, as Greg Whitby argues, they offer ways by which the grip of traditional directive teaching models can be loosened (Whitby, 2013).

In summary, I have argued that pedagogies for the future should be about teachers, increasingly in partnerships with students, deciding on an orientation to learning, and selecting a teaching model and strategies consistent with the aim of the topic/unit and the needs and readiness of the students.

Recommendation 16:

That ASPA explore with the Australian Institute for Teaching and School Leadership, and state/territory education departments, the idea of a teaching and learning framework to inform and guide professional discussion and practice.

What are the blockages?

Blockage 1: The dominant tendency to view teaching approaches as a choice between explicit instruction or inquiry

What are the blockages to implementing a framework like the one described above? One of the major impediments is the dominant dichotomy between teacher-directed instruction and inquiry. This dichotomy is pushed by influential organisations like the OECD, and repeated by international consultancy groups like McKinsey and Company, and think-tanks such as the Centre for Independent Studies. To explain the problem, I need to sketch out what is actually involved in inquiry-based learning.

When first designed, inquiry approaches were prominent in the teaching of science (e.g., Schwab, 1962), but slowly they spread to other areas of the curriculum. Over time, a number of different models of inquiry learning have developed, such as inductive and deductive inquiry, discovery learning and problem-solving. Common to each is the focus on individual or group investigations of problems, scenarios, puzzles and dilemmas. However, approaches vary in such matters as purpose, method and sequence of steps; and in terms of the extent to which teachers are in control of topic choice and process (e.g. structured and controlled inquiry) or students have greater agency (e.g. guided and free inquiry). In other words, there is not a homogenous inquiry model of teaching. Those using the term need to be explicit about the approach to which they are referring.

Apart from variations within inquiry approaches, it is important to understand that whilst they have a student-centred emphasis, they were never considered to be the only teaching model with that emphasis. Well-known books on models of teaching describe many other models of teaching that are student-centred, but each have very different purposes (e.g. Joyce et al., 2017). Thus the concept attainment model is specifically structured so that students learn the process of understanding and applying key concepts, or the controversial issues model is designed to assist students to learn how to understand and develop a stance on an important social or political issue (Moore et al., 1991, Chapter 2). In summary, the inquiry model can take a number of different forms and is just one of a number of models in the teaching toolkit. However, this is not how inquiry teaching is represented in the public arena. I will use a recent example to demonstrate the extent of confusion that exists.

In the 2015 PISA tests, the OECD interviewed 15-year-old students about the extent to which they experienced inquiry teaching in their science classes. The questions seemed to be based on the idea that inquiry in science involved students in practical experiments, class debates, and the teacher giving them time to explain ideas and use the scientific method. As I have shown, this is a very limited idea of what constitutes inquiry learning, and in any case it only applied to science teaching. Notwithstanding, the OECD then aggregated

the responses, and correlated them with the PISA test scores to come up with an index of inquiry-based instruction purporting to show that for many countries there was a negative correlation between inquiry-based teaching and success in the science tests (OECD, 2016).

Despite the distorted view of inquiry and the suspect methodology upon which the OECD report was based, once the report hit the public domain its findings were further distorted. Commentators and consultants turned the results – remember they were based on interviews about science teaching with 15-year-olds – into generalisations about teaching in all subjects across all year levels. At the same time, they confirmed the idea that there are only two forms of teaching. Thus, a recent McKinsey & Co. report argues that:

There are two dominant types of teaching practices. The first is 'teacher-directed instruction,' in which the teacher explains and demonstrates ideas, considers questions, and leads classroom discussions. The second is 'inquiry-based teaching,' in which students are given a more prominent role in their own learning—for example, by developing their own hypotheses and experiments. We analyzed the PISA results to understand the relative impact of each of these practices. In all five regions, when teachers took the lead, scores were generally higher, and the more inquiry-based learning, the lower the scores. (Mourshed et al., 2017)

In *The Australian*, two researchers from the Centre for Independent Studies claimed that:

Consistent with decades of research, ... OECD findings indicate that teacher-directed instruction is highly beneficial for student learning. Inquiry-based teaching, which in some ways is the opposite of teacher-directed instruction, is characterised by class-led learning activities and encouragement of discovery through group collaboration. This style of teaching is associated with less student achievement. (Joseph & Buckingham, 2018)

In both examples, the authors rely on flawed research, lack understanding about what is entailed in inquiry teaching, and construct teaching as a simple either/or proposition between direct instruction or inquiry. Unfortunately, ill-informed views like these have become dominant in public discussions about education. They are a significant impediment to the possibilities for developing richer and deeper pedagogies capable of meeting the challenges of the future. The proposal for a framework like the one suggested above may help the profession to speak back against those who simplify pedagogical work.

Recommendation 17:

That ASPA agrees on a pedagogical framework that captures the key elements of teaching and learning, and provides a platform enabling it to speak back against 'research' that over simplifies the complexity of teaching.

Blockage 2: The appropriation of progressive ideas for instrumental purposes

In the introduction to this report, I described the standardising influence of the GERM in shaping education policy around the world through high-stakes testing and intrusive forms of accountability. If the case study shows anything, it is that standardising education in this way is incompatible with the kind of pedagogy needed for the 21st century. However, it is sometimes not immediately apparent that GERM-like policies are being proposed because recently there has been a tendency to connect them to an idea, or clothe them in a language, which appears to be consistent with 21st century learning. This masks the instrumentalism at the core of the policies. To demonstrate this process at work, I will use an example from the Gonski 2.0 report, which was a review into ways to 'achieve excellence in Australian Schools' (Gonski et al., 2018).

The central proposal in the Gonski 2.0 report relates to ‘personalised learning’. Using the well rehearsed argument that all students should be able to demonstrate a year’s learning growth every year, the report recommends that schools move from a curriculum based on year levels to one expressed as ‘learning progressions’ independent of year or age. It claims that this move will enable schools to better meet the individual learning needs of students.

The report says that the straitjacket of organising by year levels is a remnant of the industrial era and must change if schools are to come into the 21st century. The idea of scrapping year levels potentially creates a greater flexibility for students and teachers. Rather than aiming curriculum at the average of a cohort of students at a particular age, teachers are able to ‘personalise’ the curriculum by making an individual student’s readiness for learning the key criterion for curriculum planning. Of course a number of schools already do this, and in many other schools where year levels are still used, teachers use adaptive or differentiated teaching to cater for individual interests.

There is always a danger that removing year levels will result in a return to streaming if teachers group students according to perceived ability levels rather than age, but this is not an automatic outcome and can be guarded against. However, the question of removing year-level structures cannot be separated from the issue of what is taught and how. And it is here that I think the report has taken a progressive idea like *personalisation* and colonised it with the *standardisation* agenda.

There are many different approaches to personalising learning. Some approaches enable teachers and students to negotiate learning programs based on interests and learning needs. For example, in the Big Picture schools in Australia and the US, students investigate topics or issues individually or in groups, and report on their findings (e.g. Washor & Mojkowski, 2014). The key to the learning involves skilled teachers assisting students to make connections across the curriculum as understandings about key concepts and discipline-based knowledge are built.

“However, the question of removing year-level structures cannot be separated from the issue of what is taught and how. And it is here that I think the report has taken a progressive idea like *personalisation* and colonised it with the *standardisation* agenda.”

But that is not the version of personalised learning proposed in the Gonski 2.0 report. It recommends an approach where content and skills across every area of the curriculum are atomised into bite-sized chunks of knowledge, and then sequenced into progression levels. Students work on their own and, at regular points, use online assessment tools to test their readiness for the next chunk of knowledge. Once one level is mastered, they move onto the next.

The report recommends that over the next five years, the recently developed and implemented Australian Curriculum should be rewritten so that EVERY learning area and EVERY general capability is written up as a number of progression levels. It offers an example of ‘spelling’ being broken into a 16-level progression, with students mastering each step before moving lock-step onto the next level (Gonski et al., 2018, p. 33).

The Gonski version of personalised learning is not unlike the model of direct instruction developed in the 1960s (Bereiter & Englemann, 1966). That model is a tightly scripted, step-by-step approach that follows a predetermined sequence through packaged resource materials. Assessment follows each instruction phase

with tests aligned to the behavioural goals of the program. The results are fed back to the teacher and student and the stage is then set for the next phase (Luke, 2014).

The direct instruction process bears an uncanny resemblance to what the Gonski 2.0 report is proposing where students 'advance incrementally' (p. 31) through progression levels and at regular intervals are assessed by an online formative assessment tool, which is '*calibrated against the learning progressions – that measures student attainment and growth in attainment levels over time*' (Gonski et al., 2018. p. 63). The description of the online assessment tool is revealing:

Critically, the tool should hold a large store of validated assessment items and tasks in multiple learning areas, mapped across the learning progressions to enable teachers to measure a student's attainment. Teachers could select items of their choice from the pool of appropriate assessment tasks, in order to identify the level of attainment of a student in a particular subject or learning area prior to tailoring teaching or developing their learning unit. The student would then undertake those tasks, either electronically or as an open-ended task set by the teacher. The task could be marked via the online tool, or the teacher could validate or mark the task and enter the scores. On the basis of the evidence provided about the student's current level of attainment, the teacher could then personalise the next challenge in learning for the student, assisted by suggestions made by the learning tool. (Gonski et al., 2018, p. 64)

Although there is an apparent nod in the direction of teacher decision-making, it is inevitable that the tightly scripted nature of the process would result in the use of online resources. The recent manifestation of this model in the US has been a financial bonanza for private technology companies that have developed online tests and learning resources capable of tracking the progress of, and devising programs for, individual students.

With such programs, students become individual automatons moving through standardised progression levels. And teachers are increasingly excluded from the process, as planning and decision-making is done by algorithms. The result is a narrow and highly individualised learning experience that is unlikely to prepare students adequately for the challenges of the 21st century.

The point is that personalised learning can take many forms. Some approaches will liberate learners, some will tightly constrain them. The model being proposed by the report is more likely to do the latter, and thus work against the benefits that could accrue from abandoning the organisation of schools by year levels. In this way, a progressive idea like personalised learning is enlisted to serve a highly instrumentalist agenda. Far from moving schools away from an industrial model, it would entrench such a model. I am not claiming that this is the intention of the proposal, but surely, at the very least, the idea of progression levels and online formative assessment tools need to be trialled and be the subject of widespread professional discussions, rather than imposed by decree.

When education ministers from around the country meet to discuss the report, they must look closely at the version of personalised learning it proposes. They must ensure that the approach they support is one that nurtures a love and a passion for learning, not one that reduces learning to a checklist. Surely it would be better to evaluate a number of different models of personalised learning than sanction an immediate overhaul of the Australian Curriculum based on one narrow and untried approach.

Recommendation 18:

That ASPA urges the Education Council to reject Recommendation 11 of the Gonski 2.0 report, and instead establish a project to evaluate different approaches to personalised learning currently being used in Australian schools.

Table 6 provides a summary of the implications for pedagogy.

Table 6: Summary of implications for pedagogy

Sub-questions	Aspect: Pedagogy
<i>What did the case study tell us, and what pedagogical changes are suggested by it</i>	Pedagogies of the future depend on teachers selecting an approach, from a tool kit of approaches, which best suits the purpose of the topic or program, the context of the study, and students' interests, readiness and needs. This means that the profession requires a framework for teaching and learning which includes principles, views of learning, models of teaching, strategies of teaching, assessment and class organisation (see Rec. 16).
<i>What are some blockages to change happening?</i>	<ul style="list-style-type: none">- The dominant tendency to view teaching approaches as a choice between explicit instruction or inquiry (see Rec. 17).- The appropriation of progressive ideas for instrumental purposes (see Rec. 18)

Summary

Step 4 of the model has involved exploring ideas for the official curriculum and pedagogy that were suggested by the case study of the third/fourth industrial revolution in Step 3. The four key components of a contemporary curriculum – disciplinary learning, interdisciplinary learning, general capabilities and meta-learning – and the kind of pedagogy and assessment that will enact them, demand some significant changes to the intended curriculum and to pedagogical practice. However, I have argued that unlike the traditional approach to educational change, if change is to occur, it will be important to address the range of blockages within the dominant discourses about the official curriculum and pedagogy. Not to do so will simply ensure that any change proposals are absorbed into the dominant grammars (Tyack & Tobin, 1994) of the curriculum. Once these obstacles have been removed, it is time to consider the broader environment into which the change will be introduced.

“Obstacles to change are not only present within the focus of the change itself (in this case the intended curriculum and pedagogy), but are created by the established practices and cultures into which they are introduced.”

PART E: Step 5

What are the blockages to curriculum and pedagogical change?

If Step 4 involved an examination of the changes needed to curriculum and pedagogy as a result of the implications of the case study of the third industrial revolution, Step 5 looks at the environment into which the changes are to be introduced. It is based on the assumption that if there are policies and practices inconsistent with the proposed curriculum changes, it is unlikely that such change will result in the outcomes planned until the blockages are identified and removed.

Obstacles to change are not only present within the focus of the change itself (in this case the intended curriculum and pedagogy), but are created by the established practices and cultures into which they are introduced. Some obstacles are obvious, others can be difficult to detect because they have become so much a part of the 'dominant grammars' of an organisation, embedded in its culture and taken-for-granted practices (Tyack & Tobin, 1994). They can be present in classrooms, schools and education systems as a whole. In this section, I have chosen to focus on system-wide practices that create the educational environment in which the curriculum is planned and enacted.

Step 5: What obstacles are there to implementing the curriculum changes arrived at in Step 4?

The case study in Part C highlighted the need for educational systems to move beyond the certainties of the 20th century, and recognise the complexity, ambiguity and uncertainty of contemporary times. This is not something to bemoan – indeed it presents an exciting challenge. But the shift to a culture that recognises complexity and ambiguity is itself made more complex by the presence of forces that want to pull in the opposite direction. That is, there are a number of factors at work that serve to perpetuate the myth of certainty. For example, some people want to address complexity by simplifying, soothing concerns and satisfying the need for security by providing definite answers. Ironically, many of the approaches they propose are claimed to address the new demands of the future. They range from off-the-shelf models or instant solutions with pithy maxims and lots of dot points; to the imposition of policies that are vestiges of the past simply masquerading under a different name; to an obsession with standardising and testing. What is common to most, even though their prescriptions vary, is a desire for certainty, a solution, an answer to the messiness, something neat that will tie up the loose ends, a right way to proceed. In fact, the desire to reaffirm a controlled, rationalist, linear and managerial approach to education policy and practice can only compound the complexity and ambiguity that educators face because these factors resist rather than work with it.

“...there are a number of factors at work that serve to perpetuate the myth of certainty.”

Invariably accompanying such approaches is a dogmatism born of the belief in its rightness. There are some tell-tale signs of this affliction. They include approaches or models being sold with an evangelical fervour; a reluctance to engage in a dialogue about the possible disadvantages of a scheme or to explore the research base of it; and thinking in binaries – this or that, one or the other – with little appreciation of the blurring of many of our modernist framings.

“At the heart of this policy regime is an obsession with data, which is often manifested and justified under the banner of evidence-based policy and accountability.”

“Not everything that matters can be measured, and not everything that is measured matters.”

It is possible to glimpse the ghostly presence of such thinking in many of the policies that are imposed on schools today. Thus, in the first two decades of the 21st century, at a time when – as the case study demonstrates – humans are facing significant challenges and exponential change, the dominant official educational response has been to resort to the safety of standardised testing, education markets, league tables, school report cards and scripted teaching. Such responses are incompatible with the kind of curriculum changes suggested in Step 4. Unless they are challenged, they will mould any introduced curriculum change in their likeness.

At the heart of this policy regime is an obsession with data, which is often manifested and justified under the banner of evidence-based policy and accountability. Of course data makes an important contribution to any education system wanting to track progress and review programs. But when narrow forms of data are used to make snap judgements about quality, ignoring the range of factors that contribute to educational outcomes, and narrowing the focus of what is important, then it works against quality. I argue that the current obsession with data – what Muller (2018) calls a metric fixation – is nothing more than a wish for certainty, a desire to precisely calibrate and measure educational outcomes in ways that narrow and standardise education. Its ill effects have been well documented, and yet governments continue the obsession. In so doing, they are impoverishing education. After all, as the well-worn aphorism has it: Not everything that matters can be measured, and not everything that is measured matters.

However, these limiting and technical approaches are so entrenched that it won't be easy to shift them. The first step is to understand how they work and with what effect. Since the OECD's PISA is influencing the governments of nation-states to follow a standardising agenda, I will use PISA as my example of the blockages which can confront futures-focused curriculum change.

PISA as an example of how a standardising educational agenda is created and maintained

PISA is an OECD-administered test of the performance of students aged 15 years in mathematical literacy, scientific literacy and reading literacy. It has been conducted every three years since 2000, with the latest tests being undertaken in 2015 and the results published in December 2016. A different agency in each country has a contract to implement and interpret the tests on behalf of the OECD. In Australia it is the Australian Council for Educational Research (ACER).

PISA purports to test 'real-life' skills and knowledge. In 2015, 72 countries participated in the tests, which are two hours in length. For the first time in 2015, students took a computer-based test (before that it had been hand-written). It involves a stratified sample of students in each country – in Australia in 2015 about 750 schools and 14,500 students were involved in the PISA tests. All students undertook the scientific literacy

test (the major domain), as well as items from one or more of the other domains (reading literacy, mathematical literacy). Students and principals also completed questionnaires about aspects of school life. In 2015 Australia was grouped in each subject area with countries that returned similar scores, effectively making it equal 10th in scientific literacy; equal 12th in reading literacy, and equal 20th in mathematical literacy. Australia was above the OECD average in the three areas.

In 2013, the Gillard government's Australian Education Bill enshrined the aspiration for Australia to be in the top five schooling countries by 2025. Since PISA is the only way by which such a judgement can be made, obviously PISA is the benchmark for Australian education. I argue that it is contributing to a narrow and misguided view about the purposes of education, the standards of Australian education, and the policy approaches needed to maintain and enhance quality. As a result, the obsession with PISA scores is preventing Australian education from grappling with the challenges of the future and from implementing the kind of agenda proposed in Step 4. I will describe the effects of PISA from three different perspectives.

Perspective 1: PISA narrows our educational discourse

In Australia for the past decade, the self-evident starting point for debates about education has been the claim that standards in Australian education are declining relative to other countries. When there is a challenge to produce evidence for the claim, invariably it is Australia's performance on the PISA tests that is proffered. PISA, it seems, has become the arbiter of education quality. Since its inception in 2000, when PISA results are published press commentators and politicians in each country go into meltdown. The winners are eulogised while those countries that have slipped a few rungs on the league table are excoriated.

The usual script was adhered to after the release of the 2015 test results in early December 2016. When it was revealed that Australia had dropped in scores and its position on the league tables, all hell broke loose. The banner headlines variously described Australia's results as 'a catastrophe' (*Financial Review*, 6/12/16), a 'crisis' (*The Australian*, 8/12/16), and 'a disgrace' (*The West Australian*, 19/12/16). Leaving aside the obvious point about whether being in the top third of countries warrants these descriptions, the key point is that not one question was raised about whether or not PISA is an objective measure of education quality.

It was simply accepted that it is, fuelling the belief that education standards in Australia are declining.

“...the obsession with PISA scores is preventing Australian education from grappling with the challenges of the future...”

This has a number of consequences, not the least of which is that the process has created a sense of educational crisis with schools and teachers bearing the brunt of criticism, with a flow-on negative impact on morale. But more than this, the PISA results are starting to have an adverse effect on the public's confidence in Australian education, and on education policy. Following the release of the results in late 2016, many commentators took the opportunity to push their favourite policy positions to improve Australia's standing in PISA tests – most of them from the neoliberal policy armoury. They included

performance pay for teachers, giving school boards the power to hire and fire teachers, introducing intrusive accountability regimes, narrowing the curriculum, stressing rote learning and memorisation, and mandating explicit teaching and direct instruction pedagogies. Apart from the fact that these policies have failed elsewhere (e.g. Ravitch, 2016), they are incompatible with the agenda for the future suggested by the case study.

Another influence on policy are the pseudo-scientific studies of why the top five countries are more successful than Australia. For many years, the focus was on Finland; but now that country has slipped in its rankings, commentators have turned to some of the East Asian countries like Singapore and South Korea, and cities like Hong Kong. The so-called research consists of visiting countries at the top of the league table, describing some of their structures, practices and processes, guessing which variables have contributed to their success, aggregating them, and then urging that these practices are adopted in Australia. A classic of this genre is

“The so-called research consists of visiting countries at the top of the league table, describing some of their structures, practices and processes, guessing which variables have contributed to their success, aggregating them, and then urging that these practices are adopted in Australia.”

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the 2012 Grattan Institute Report (Jensen et al., 2012), which despite containing many methodological problems (Reid, 2013b) was used by politicians to inform policy and public pronouncements.

The PISA scores have become so synonymous with education quality, that the data are used unquestioningly in inquiries and reviews (e.g. Gonski et al., 2018, pp. 3–14), or by researchers, as a reference point for determining educational achievement; or by politicians trying to justify standardising policy designed to lift PISA results. In all of these reviews and policies, there is rarely evidence provided to support a relationship between the PISA data and the solutions offered. They simply jump from the apparent problem of declining PISA scores, to a solution – ignoring important intermediate steps, such as assessing the evidence, clarifying the problem, gathering extra evidence, and making a connection between the solution and the problem. PISA has become the lazy way to justify any policy proposal.

It is curious that so much store is placed on the results of a test conducted every three years, in just three subjects, by different companies/groups/agencies in over 70 countries, testing sample groups of students. The narrow base of the test belies its influence in shaping almost every aspect of education policy. Instead of public and professional discussion about the challenges of the future, PISA causes educational discourse to be pinched and backward looking. Surely in the future we need approaches to accountability that expand and enrich the education debate, rather than impoverish it.

Perspective 2: PISA narrows and standardises curriculum and pedagogy

From a curriculum perspective, PISA narrows and standardises curriculum and pedagogy, making it difficult to introduce the kind of reform agenda suggested by Step 4.

A major concern is the restricted focus of the tests. The fact is that although reading, maths and science are important, they tell us nothing about outcomes in such crucial areas as the arts, history, geography, health and PE, English literature, and civics and citizenship, to name just a few areas of the formal curriculum. Inevitably, the favoured three curriculum areas become the core subjects, attracting most of the allocated curriculum time and resources, with other areas being relegated to the margins. And yet, as the case study shows, in a globalising world, people need skills that are as much right-brain directed – such as design and art – as left-brain cognitive skills of the sort tested by PISA; and citizens and workers must increasingly be able to work with diversity and difference, and be innovative and creative. PISA tells us nothing about how education systems are faring in relation to these central capabilities. Results at one stage of schooling every three years in only three areas of the curriculum are too narrow a base upon which to make claims about the quality of Australian education.

More than this, the PISA scores mask some important things about student learning. The league table of countries based on raw scores,

obscures from public view contextual information that provides a fuller picture of student learning – and suggests that a high league table ranking may not be all that it seems. For example, the raw scores reveal nothing about student engagement. The summary of attitudes to science buried deep in the PISA report indicates that students from the top countries tend to have some of the lowest rates of wanting to pursue a science-related career (where Australia is in the top group) or of enjoying their science learning. In the 2006 science results, Finland came out on top in cognitive outcomes, but finished nearly bottom in the level of student interest in science; and in 2015 Finland finished well below Australia in terms of student wellbeing. One wonders if the top results have been gained at the expense of turning students off the study of science, and if so, whether this is something we would want to emulate in Australia?

Then there is the fact that in some countries or regions (e.g. Singapore, South Korea), which are in the top five of PISA league tables, many children are sent to after-hours cram schools to advance their chances of success in a highly competitive and exam-oriented schooling culture. Concerns are now being raised that such approaches stifle creativity, narrow the curriculum, and harm student wellbeing. Uncritically importing policies and practices from other countries on the basis of their PISA success is surely fraught with danger.

In constructing the tests, there are many cultural factors that make comparing the educational outcomes of 72 countries highly problematic. These include the difficulties associated with making an international test culturally neutral when it is converted to many different languages. Although the OECD tries to weed out culturally specific items, it cannot do this precisely, and in any case one wonders what is left of value to test once culture is washed out of language.

There is another way in which culture is homogenised through PISA. As countries seek to maintain or improve their PISA league table standings by borrowing policy, so the official curricula of many countries start to converge. For example, England is implementing the Singaporean maths curriculum, including mandating textbooks and pedagogical approaches; and there have been calls for Australia to follow suit. American educator Yong Zhao (2014) describes this as a process of ‘global homogenisation’ as the supposedly less successful countries begin to copy or borrow from the more successful countries. There are at least two reasons why chasing success in PISA by copying other countries is dangerous.

First, PISA assumes that young people in every country should know the same things and develop the same skill set. However, while there may be many similarities, such an assumption fails to appreciate the different contexts and challenges faced by people across cultures and thus the different kinds of skills needed. In any event, there is a strong case to be made that in a globalising economy countries should be looking to differentiate their skill sets, rather than to standardise them. Since the nature of the curriculum is a key determinant of the kind of educational outcomes achieved, then ‘global curriculum homogenisation’ is surely counter-productive to a country’s interests (Zhao, 2014).

Second, transplanting curriculum and pedagogy from a successful PISA country to a less successful country is dangerous since it ignores the cultural factors contributing to educational outcomes. John Jerrim (2015) looked at the performance of students who were second-generation East Asian students in Australia, and who had been educated only in Australian schools. He found that in the 2012 PISA tests, the scores of these students outperformed the scores of students in nearly every other participating school system, including those at the very top of the PISA tables such as South Korea, Hong Kong and Singapore. Research like this demonstrates the powerful influence of background and culture, suggesting that it is very dangerous to correlate PISA scores with a certain kind of curriculum or pedagogy, or make sweeping generalisations about the quality of a schooling system in a specific country.

Perspective 3: PISA gives an inaccurate reading of educational outcomes

A third perspective on the PISA story relates to whether or not it provides quality information upon which to make decisions. Given the ways in which the PISA tests are used to inform education policy, clearly a lot

of trust is being placed in the test itself. But what would happen if it could be shown that the results of PISA tests, or the ways in which they have been interpreted, need to be taken with a grain of salt, or are faulty? Where would that leave the research based on PISA results or all the policy strategies designed to address the PISA effect? I will argue that there are a number of methodological problems associated with the PISA tests that cast a dark shadow over their accuracy.

In 2013, the *Times Educational Supplement* published some articles pointing to some of the 'profound conceptual errors' upon which PISA is based. One article claimed that these flaws render the league tables as 'useless' (Stewart, 2013). To understand this argument, it is important to realise that when students sit the test, they do not answer all the questions in the three domains. Every three years the tests have a main focus subject and in 2015 it was scientific literacy. All students answered all the science questions, while some students answered some of the reading items and others answered some of the maths items. Many students were not tested at all in one domain. Despite this, the OECD produced full rankings for all subjects.

The OECD justifies this approach by saying that since its interest is system-level assessment, it does not generate scores by individuals but instead uses Rasch modelling to calculate 'plausible values for each student'. That is, it produces system-wide aggregates based on working out what the scores would have been if all students in all countries answered the same questions. This is very complex territory. But there is now a raging debate between some mathematicians about the efficacy of the OECD approach. Leading mathematician Professor Svend Kreiner, a former student of Georg Rasch the Danish mathematician and statistician who created the Rasch model, argues that the model cannot be used unless all questions have an equal degree of difficulty in all countries. Since this cannot be guaranteed in PISA, then the 'plausible values' are unreliable, which means that the league table rankings are totally meaningless (Kreiner & Christensen, 2014). Other mathematicians agree that the validity and reliability of the test is, at best, dubious.

There are also problems with using the PISA data to make comparisons between countries and previous

test results. First, in constructing the tests, there are many cultural factors that make comparing the educational outcomes of 72 countries highly problematic. These include the difficulties associated with making an international test culturally neutral when it is converted to many different languages.

A second problem is that some of the top place getters in PISA (e.g. Hong Kong, Macao, Taipei and Beijing-Shanghai-Jiangsu-Guangdong) are cities/regions, not countries. This makes comparisons problematic. If it is valid to compare the results of cities with countries, why not make the ACT, with its comparatively affluent demographic, our representative in the PISA tests. Australia would then rise to fifth on the science ladder!

The third problem is associated with how the tests are conducted. What happens in one country is never identical to what happens in another, and these differences – even when very small – affect the capacity to compare the results across countries. For example, some researchers have questioned the sampling techniques employed in some countries. When Shanghai-China finished top in each of the three domains in the 2012 PISA tests, Tom Loveless from the Brookings Institute in Washington argued that Shanghai's sampled students were not a representative sample of the students in that city. He pointed out that Shanghai's sample of 15-year-old students did not include the thousands of students from poor rural areas whose parents have moved to the city in search of work. These people hold a hukou, the Chinese equivalent of an internal passport, which identifies them as belonging to their former region, not Shanghai, and thus ineligible for public services in Shanghai, including the mainstream public schooling system. The hukou system means that rural children, many of whom have low levels of literacy, are either left behind in their villages or driven back there to attend high school; or are placed in inferior and very poorly resourced separate schools for migrants in Shanghai. Their absence clearly skews the PISA results by removing from the population of 15-year-olds in the city many of the students who would drag its PISA scores down (Loveless, 2013).

Finally, there is the issue of comparing PISA results from one testing period to the next. Prior to 2015, PISA tests were pen and paper-based. This changed for the 2015 tests when tests shifted to being

computer-based. When the 2015 results were released, there was a puzzling reduction of up to 10% in the percentage of students achieving high tests scores from a number of the top five countries, including East Asian countries and cities such as Taiwan, South Korea and Hong Kong. There is now strong speculation that the drop was a result of the changed delivery mechanism for the tests. The person in charge of PISA, Andreas Schliecher, has admitted that the OECD cannot explain the reasons for the drop, and that the decline may be to do with the fact that computers were used for the first time. This renders as highly suspect claims about the decline in scores, and calls into doubt once again the reliability of the PISA tests itself (Ward, 2017).

These and other technical issues suggest that the doubts overshadowing the technical aspects of PISA are now of such gravity that they demand a product warning when results are released. Instead, journalists and ministers of education fall over themselves in the crush to make comment and devise policy in the belief that PISA scores offer a precise reading of the health of an education system. If the PISA tests are too narrow and contain some serious technical flaws then the use of PISA data to pass judgement about the educational quality of a country is highly problematic at best and potentially dangerous at worst.

Combining the perspectives on PISA: How a flawed test produces flawed research

One of the oft-repeated claims of those who push a standardising agenda is that they are committed to 'evidence-based' policy or practice. This sounds like a rigorous approach to policymaking, and yet often it is no more than a cover for legitimating or confirming already determined policies, or to shut down debate with the claim that 'research shows'. There are a number of techniques used to do this under the cover of evidence-based policy. Examples include cherry-picking research to suit the policy, using non-refereed research, or ignoring the fact that research involving synthetic meta-analyses or randomised control trials should not be transplanted directly and unproblematically to a different context (Biesta, 2010).

The PISA example used in this section of the paper highlights another danger of the evidence-based policy mantra: the use of inaccurate data, either for making generalised claims (e.g. the quality of Australian education has declined), or as the basis of a research project. I will use the PISA example again to show how research developed in this way can result in flawed research, and distort public perceptions about education quality. I draw my example from the research into the impact of classroom disciplinary climate on student learning, using data from the 2015 PISA tests.

PISA and its 'research' on disciplinary climate

During the PISA testing process, other data are gathered to flesh out a full picture of some of the contextual and resource factors influencing student learning. Thus in 2015, principals were asked to respond to questions about school management, school climate and school resources, and student perspectives were gleaned from a range of questions and responses relating to science, which was the major domain in 2015. These questions focused on such matters as classroom environment, truancy, classroom disciplinary climate, motivation and interest in science.

These data are used to produce key findings in relation to school learning environment, equity, and student attitudes to science. Such findings emerge after multiple cross correlations between PISA scores, student and school socio-economic status, and the data drawn from responses to questionnaires. They are written up in volumes of OECD reports, replete with charts, scatter plots and tables.

In 2015, one of the topics about which students were asked to respond related to classroom discipline. They were asked: How often do these things happen in your science classes?

- Students don't listen to what the teacher says
- There is noise and disorder
- The teacher has to wait a long time for the students to quieten down
- Students cannot work well
- Students don't start working for a long time after the lesson begins.

Then, for each of the five statements, students had to tick one of the boxes on a four-point scale from (a) never or hardly ever (b) in some lessons (c) in most lessons (d) in all lessons.

Even before we look at what is done with the results of the questions posed in PISA about classroom discipline, alarm bells are ringing. For a start, the five statements listed are based on some unexplained pedagogical assumptions. They imply that a disciplined classroom environment is one that is quiet and teacher directed; but there is no rationale provided for why such a view has been adopted. Nor is it explained why the five features of such an environment have been selected above other possible features. They are simply named as the arbiters of disciplinary climate in schools.

However, let's accept for the purposes of this analysis that the five statements represent a contemporary view of classroom disciplinary climate. The next problem is one of interpretation. Is it not possible that students from across 72 countries might understand some of these statements differently? Might it not be that the diversity of languages and cultures of so many countries produces some varying interpretations of what is meant by the statements? For example, what constitutes 'noise and disorder' in one context/culture might differ from another; or, for different students, a teacher 'waiting a long time' for quiet might vary from 10 seconds to 10 minutes; or, 'students cannot work well' might be interpreted by some as 'I cannot work well' and by others as 'they cannot work well', and so on.

These possible difficulties appear not to trouble the designers, because from this point on, certainty enters the equation. The five questionnaire items are inverted and standardised with a mean of 0 and a standard deviation of 1, to define the index of disciplinary climate in science classes. Students' views on how conducive classrooms are to learning are then combined to develop a composite index – a measurement of the disciplinary climate in their schools. Positive values on this index indicate more positive levels of disciplinary climate in science classes.

Once combined, the next step is to construct a table purporting to show the disciplinary climate in the science classes of 15-year-olds in each country. The table comprises an alphabetical list of countries, with the mean index score listed alongside each country, so allowing for easy comparison. This is followed by a series of tables containing overall disciplinary climate scores broken down by each of the disciplinary 'problems', correlated with such factors as performance in the PISA science test, schools and students socio-economic profile, type of school (e.g. public or private), location (urban or rural) and so on. It is possible to see here how the report – despite the many methodological flaws upon which it is based – has now taken on the aura of scientific precision and accuracy.

The ACER report summarises these research findings from an Australian perspective. First, it compares Australia's 'mean disciplinary climate index score' to selected comparison cities/countries such as Hong Kong, Singapore, Japan and Finland. It reports that:

Students in Japan had the highest levels of positive disciplinary climate in science classes with a mean index score of 0.83, followed by students in Hong Kong (China) (mean index score: 0.35).

Students in Australia and New Zealand reported the lowest levels of positive disciplinary climate in their science classes with mean index scores of -0.19 and -0.15 respectively, which were significantly lower than the OECD average of 0.00 . (Thomson et al., 2017, p. 277)

Then the ACER report compares scores within Australia by state and territory; by disciplinary problem; and by socio-economic background. The report concludes that:

Even in the more advantaged schools, almost one third of students reported that in most or every lesson, students don't listen to what the teacher says. One third of students in more advantaged schools and one half of the students in lower socioeconomic schools also reported that there is noise and disorder in the classroom. (Thomson et al., 2017, p. 280)

It should be noted that there would need to be a number of caveats placed on the research outcomes. First, the data relate to a quite specific student cohort who are 15-years-old, and are based only on science classes. That is, the research findings cannot be used to generalise about other subjects in the same year level, let alone about primary and/or secondary schooling. Second, there are some questions about the classroom disciplinary data that call into question the certainty with which the numbers are calculated and compared. These relate to student motivation in answering the questions, and to the differing interpretations by people from many different cultures about the meaning of the same words and phrases. Third, there are well-documented problems related to the data with which the questionnaire responses are cross-correlated, such as the validity of the PISA test scores that I described in the previous section.

In short, it could be that discipline is a problem in Australian schools, but this research cannot provide us with that information. Surely the most one can say is that the results might point to the need for more extended research. But far from a measured response, the media fed the findings into the continuing narrative about falling standards in Australian education.

When ACER released its report, the headlines and associated commentary once again damned Australian schools. *The Australian's* headline described 'Chaos in the Classroom' (15/3/2017), while Adelaide's *The Advertiser* carried the headline: 'Disorder the order of the day for Aussie schools', reporting that:

Australian school students are significantly rowdier and less disciplined than those overseas, research has found. An ACER report, released today, says half the students in disadvantaged schools nationally, and a third of students in advantaged schools, reported 'noise and disorder' in most or all of their classes ... In December, the Advertiser reported the [PISA] test results showed the academic abilities of Australian students were in 'absolute decline'. Now the school discipline results show Australian schools performed considerably worse than the average across OECD nations ... Federal Education Minister Simon Birmingham said the testing showed that there was 'essentially no relationship between spending per student and outcomes. This research demonstrates that more money spent within a school doesn't automatically buy you better discipline, engagement or ambition', he said. (Williams, The Advertiser 15/3/17)

Mainstream newspapers all over the country repeated the same messages, and media commentators and politicians had fodder for a fresh round of teacher bashing. It is instructive to list what has happened to this PISA-based research.

- The mainstream press has broadened the research findings to encompass not just 15-year-old students in science classrooms, but ALL students (primary and secondary) across ALL subject areas.
- The research report findings have been picked up without any mention of some of the difficulties associated with conducting such research across so many cultures and countries. The numbers are treated with reverence, and the findings as an immutable truth.

- The mainstream press has cherry-picked negative results to get a headline, ignoring such findings in the same ACER report that, for example, Australia is well above the OECD average in terms of the interest that students have in their learning in science, and the level of teacher support they receive.
- Key politicians began to use the research findings as a justification for not having to spend more money on education, and to blame schools and students for the ‘classroom chaos’.

These errors and omissions reinforce the narrative promulgated in the mainstream media and by politicians and current policymakers that standards in Australian education are in serious decline. If such judgements are being made on the basis of flawed data reported in a flawed way by the media, they contribute to a misdiagnosis of the causes of identified problems, and to the wrong policy directions being set.

The information garnered from the PISA process every three years may have the potential to contribute to policymaking. But if PISA is to be used as a key arbiter of educational quality, then we need to ensure that its methodology is subjected to critical scrutiny. And politicians and policymakers alike need to look beyond the simplistic and often downright wrong media reporting of PISA results.

Some reflections on PISA

Step 5 involves identifying the obstacles to the introduction of the kind of educational agenda proposed in Step 4. I have argued that at the system-wide level the current standardising approach to education is at odds with the purposes and the form of what is needed for a contemporary official curriculum and pedagogy. PISA was used as an example to show how a specific policy can serve to narrow the curriculum, whilst washing out the complexity of educational issues, leading to a misdiagnosis of the causes of educational issues and problems, and the wrong policy directions being set. The end result of this process is that it provokes a sense of crisis about declining standards in a system, which by any measure is one of the best in the world, and adversely affects the morale of hard-working educators.

It is important to stress that a critique of PISA is not a defensive educator’s response to adverse data. I believe strongly that we need mechanisms to assess outcomes from our education system, that our schools and policymakers must be accountable, and that we should always be striving to improve the quality of Australian education. What I am arguing is that superficial and knee-jerk readings of international test data are more likely to impede than to advance the quality of education in this country. As it is currently constructed, interpreted and used, PISA is counterproductive to quality education. Surely more open and educative ways to assess educational progress can be devised.

“What I am arguing is that superficial and knee-jerk readings of international test data are more likely to impede than to advance the quality of education in this country. As it is currently constructed, interpreted and used, PISA is counterproductive to quality education.”

Other examples could have been used to show the importance of ensuring that proposals for educational change are not blocked by policies that standardise and narrow education. In each case it means assessing if a policy is incompatible with the proposed change, understanding the consequences of the policy, and devising ways to overcome the adverse effects. This doesn’t call for wholesale change. In the case of PISA, international comparisons may well yield some interesting information. But we must ensure that policy, media commentary and research premised on PISA test results should at least acknowledge the difficulties and limitations of the tests, and be much more tentative about using PISA as the sole arbiter of what constitutes quality in education.

The use of PISA to assess quality and as the major benchmark for our national educational aspirations is fraught. In an attempt to arrest the supposed decline of Australian education, governments are proposing educational agendas that are contradictory to what the case study shows is needed in the future. Unless the stranglehold of PISA is loosened, any reform agenda is doomed to fail.

Given what is now known about assessment and evaluation in education, surely we can develop more enlightened approaches to assessing education outcomes – both in Australia and internationally – than a two-hour, pen and paper test held every year (in the case of NAPLAN), and a computer test every three years (in the case of PISA). New approaches might include some light sampling of a range of subjects and domains across a three to five year period; working with other countries to find ways to assess the development of such important attributes as critical thinking, creativity and intercultural understanding¹²; using a range of mediums for students to demonstrate their learning; and ensuring that methods to assess outcomes reflect agreed goals, and are based on more than just one form of assessment.

Recommendation 19:

That ASPA advocates publicly, and to the federal government, for a formal review of PISA which investigates the validity and reliability of the tests and their impact on Australian education.

Recommendation 20:

That ASPA collaborates with other professional associations to convince state/territory governments and the federal government to trial different ways to assess educational outcomes that are more educative than standardised tests.

Of course, it is not just a matter of identifying what policies and practices will get in the way, and doing something about them. It is just as important to understand the conditions and practices that will foster the kind of curriculum and pedagogy identified in Step 4. It is to that issue I will turn in Part F, which engages with the sixth and final step of the process.

¹² The OECD is working on developing tests for 'critical and creative' thinking, and 'global competence', to be added to the current PISA testing regime. Unless the problems identified in Part E are addressed, the new assessment tools will carry all of the same flaws.

PART F: Step 6

What cultures will promote curriculum and pedagogical change?

It is not enough to just remove the impediments to change as is the focus of Step 5. If the change is to occur in more than name only, then there must also be a set of supporting conditions. These range from physical resources, to human resources, to the culture of an organisation – and they need to be tailored to suit the demands of the change. For example, if new skills and understandings for staff are required, then appropriate professional development programs are needed. The role of Step 6 is to identify the conditions and practices that will support the change.

The most important element of the supporting conditions is consistency between the changes and the culture into which they are introduced. This means ensuring that the values and practices of schools and systems do not exude characteristics that are incompatible with the change. Even the most dynamic change ideas will founder on the rock of an incompatible culture. Thus, a key aspect of Step 6 is to identify what kind of cultures will help to build and sustain the changes suggested by Step 4, rather than work against them. I have chosen to examine the question of cultural consistency as an example of what is involved in Step 6.

Step 6: What conditions and practices will enable the changes identified in Step 4?

In 1968 Philip Jackson coined the term ‘the hidden curriculum’ to describe the unofficial or unintended lessons, values and perspectives that students learn in schools. They are hidden because they are not a part of the formal curriculum, such as lessons and learning activities. Rather students absorb lessons through, for example, school rules about what behaviours are considered unacceptable. The lessons are hidden because they are unexamined. They may reinforce the formal curriculum or they might contradict it by revealing inconsistencies between what a school says are its purposes and values of education, and what students actually learn (Jackson, 1968).

Just as Jackson exposed the hidden curriculum in a school, so too is there a hidden curriculum in education systems as a whole. The policies and practices of systems reveal a lot about what is valued and not valued. And like schools, the ways in which education systems operate can contradict the fine sounding mission statements and strategic plans that invariably litter the organisational landscape.

“The policies and practices of systems reveal a lot about what is valued and not valued.”

What then, are the cultures that will be consistent with the kinds of curriculum and pedagogical change suggested by Step 4? The case study demonstrates that educational systems and schools in the future must have cultures that eschew certainty and dogmatism. This doesn't mean that decisions are never made, but rather that decisions are provisional, based on the best available evidence, context specific, and always open to review. In other words, there needs to be a culture of open-minded discussion and debate where the participants can systematically review and inquire into questions, problems and dilemmas that face them in their context. This is very different to an approach involving the wholesale transport of strategies or programs developed elsewhere, or the imposition of ideas labelled as *best practice* with the insistence that no other ideas can be entertained.

“...there needs to be a culture of open-minded discussion and debate where the participants can systematically review and inquire into questions, problems and dilemmas that face them in their context.”

There are a number of aspects of a culture compatible with the curriculum and pedagogical changes suggested in Step 4, and these will be explored below. I will explore consistency between purposes and aims, policies and practices, and culture in the context of education systems as well as schools.

Culture of research and inquiry

The case study shows that many of the issues facing educators today are context-bound: they are not amenable to universal solutions. That is, educators face the considerable challenge of designing curricula for local contexts that are flexible enough to address the rapid growth of knowledge, and that recognise the increasing religious, cultural and ethnic diversity in their student populations. In the 21st century, therefore, educators need to be inquirers into educational practice who can question their routine practices and assumptions, and who are capable of individually and collaboratively investigating the effects of their teaching on student learning (e.g. Darling-Hammond, 2000; Farrell, 2004; Reid, 2004). From this perspective, educators are people who learn from teaching, rather than people who have finished learning how to teach (Darling-Hammond, 2000).

This is not something that is done only at the level of individual classrooms: it should be a culture that permeates the school and education system. Not only will it result in better decision-making at these levels, but it will serve as an important pedagogical tool. After all, if it is the task of educators to develop in children and young people the learning dispositions and capacities to think critically, flexibly and creatively, then educators must possess and model these capacities.

In my view, the need to create a culture of research and inquiry¹³ is one of the most important challenges facing educational institutions, their systems and their leaders in the future. How much more productive would it be for education systems to put resources into developing and sustaining cultures of inquiry and research, than into instruments of measurement and surveillance?

There are many fine examples of inquiry-based practices in schools. And yet the administrative/bureaucratic arms of most education systems don't function in the same way. Unless the operations of the central offices in education systems are also consistent with inquiry they can actually work against it. This can only happen by shifting from the dominant managerial model of educational organisation and change, to an authentic inquiry-based model.

“How much more productive would it be for education systems to put resources into developing and sustaining cultures of inquiry and research, than into instruments of measurement and surveillance?”

¹³ I draw a distinction between research as a formal peer-reviewed activity, and inquiry as a systematic investigation into practice that does not need to conform to the accepted conventions of research. Elsewhere I have argued that all educators should be inquirers into educational practice; and that some educators may be researchers. This distinction emphasises the importance of the one to the other, but removes from practitioners the unrealistic expectation that whenever they embark on a process of inquiry they must conform to the widely accepted conventions of research. The distinction between inquiry and research also points to the centrality of research to a culture of inquiry. Published research should be a rich source of information for those engaged in reflecting on their work practices or in developing policy, provided that it is not simply transferred unproblematically, but is read in the context of the issues being explored through inquiry. It ensures that inquiry is open not closed; expansive not constrained. In this way inquiry and research can be seen as different sides of the same coin.

Challenging the dominant managerial model

Most education systems operate through a model that constructs teachers as technicians whose job it is to implement plans, policies and products developed by others. In this dominant organisational model a policy, plan or product is developed in a central office – usually as a response to emerging needs or a government priority – and the task of schools is to implement that policy. Ironically one of the responses to the speed of change has been to strengthen this view. Thus, often the reaction to the challenges of the new environment has been to devise and implement more policy, produce more packages and construct more accountability mechanisms. It is an old response to a new challenge.

Of course, the extent to which this happens in isolation from schools varies depending on the system. Sometimes there are processes of consultation. But invariably the common element of a consultation is a focus on the detail – it rarely involves conceptualising the key ideas. In addition, the consultation process itself is usually in relation to the product or policy at a particular point in time: it stops when the development phase is over.

This managerial model does not of itself prevent practitioner inquiry in schools. However, there is no systematic way by which the knowledge and insights that emerge from inquiry, or the issues that are identified as a consequence of it, are fed into the policymaking process on a regular basis. Inquiry is confined largely to the school; improving classroom practice but contributing only marginally to the wider professional knowledge in the system.

There are a number of problems with this dominant managerial model. First, the model impoverishes the knowledge base for educational policymaking. By foregrounding bureaucratic knowledge, the model marginalises arguably the most consequential knowledge in an education system: school-based knowledge produced by educators in the context of working with children and young people.

Second, the model promotes a façade of change. All that has been discovered about educational change over the past 20 years tells us that change occurs when those whose practice is the focus of change are involved in the process of challenging

and rethinking the assumptions and theories upon which their practice is based (e.g. Fullan, 2015). Unless this happens, imposed change in the form of a new product is simply filtered through the lens of established beliefs and practices, and is colonised by that practice. The same things are done with new labels.

Third, the model limits the possibilities for real improvement, because it does not encourage educators to focus on deepening their understanding about teaching and learning. It implies that new products (a new resource, curriculum or off-the-shelf model) can solve teaching issues or problems. This is not to denigrate the use of quality resources, rather to make the point that the use of these resources is most powerful in the context of inquiring into possible answers to teaching and learning issues, not as something to be seen as a magic elixir for all contexts.

Finally, the model promotes superficial forms of external accountability. It understands accountability to mean closing the gap between what is developed (or aspired to) centrally and the outcomes in schools. When the gap refuses to close, the fault is invariably located with schools. This is a spurious form of accountability because it encourages educators to hide issues and problems, rather than discuss them openly. In so doing, it contributes to the privatisation of professional practice. Real accountability comes from genuine attempts to deepen understandings about teaching and learning through inquiry and research, in an atmosphere of collaboration and trust. Imposed accountability encourages smoke screens; real accountability is transparent.

In summary, the dominant model of system organisation establishes a dislocation between the central office and schools. The model creates its own logic and dynamic. On the basis of this model, the response to the new demands of the contemporary environment is to develop another product or policy to meet the challenges of new times. Invariably, inside the new approach beats the heart of the old model of change. What is an alternative? How else might a system operate?

Towards an inquiry-based approach to educational change and improvement

A culture of research and inquiry represents a different way to think about the system and its approach to educational change and improvement. Here, inquiry is added to the mix in a way that alters the dynamics and logic of the system. It is the fuel that makes the system work. In this model, educators are engaged in inquiry and research into the issues, problems, puzzles and dilemmas associated with their educational practice. The new knowledge and the issues that emerge from this process feed back into classrooms and schools, deepening learning and reinvigorating professional discussion and debate. But more than this, there are structures and processes in place that enable these insights and issues from inquiry to be aggregated and responded to by the central office, such as in the form of changing policy or providing resources to meet emerging demands.

It is important to understand that this model is not a bottom-up approach. Rather, it is constructed upon an iterative dynamic between the various layers of the system. This dynamic doesn't obviate the need for the central identification of systems priorities. Governments will continue to express priorities, although they may be affected by the knowledge that is being produced, and issues that are being identified, by schools. But much of the work of the central office will involve responding to the implications of what is emerging from inquiry and research in relation to these priorities – meeting the needs identified by schools for learning and professional development resources, providing arenas in which the new professional knowledge can be shared and debated, altering policies to reflect new insights, and so on.

It is also important to understand that the model is not suggesting that the only worthwhile knowledge is that produced in schools. Far from it. The sort of inquiry being argued for here must draw on innovative ideas and the latest research that is produced elsewhere, in other contexts and other countries. But the difference is that these ideas would not be imposed or seen as best practice. They would be treated as part of the inquiry-mix, examined systematically by those engaged in the business of educating.

“The sort of inquiry being argued for here must draw on innovative ideas and the latest research that is produced elsewhere, in other contexts and other countries.”

In summary, contemporary challenges demand educators who practise inquiry and research as a way of professional being. However, such an aspiration cannot be realised unless a system-wide culture is established that is consistent with inquiry and research. It means rethinking dominant forms of educational organisation at a system-wide level. This is a leadership challenge of some magnitude, but models consistent with research and inquiry have the potential to:

- foster deeper understandings about teaching and learning and thus enhance student learning outcomes
- generate excitement and enthusiasm as educational ideas are discussed and new professional knowledge is shared within schools, and across education systems as a whole
- lead to genuine forms of accountability that are based on collaborative efforts to identify problems and their causes
- make central office policy, plans and products responsive to the needs of schools
- contribute to the breaking down of the them and us culture that has developed in education systems in recent years

- lead to genuine change because it is consistent with what is known about the factors that promote change
- cohere public education systems around a focus on student learning, whilst enabling a great deal of flexibility within schools
- ground the idea of a learning organisation.

But just as there are many advantages, so too are there dangers. A key one of these is the danger of superficiality, where the concept of inquiry is embraced enthusiastically but applied uncritically to many activities and issues without a deep understanding of the conditions that are needed for it to flourish. It is crucial that an education system moves gradually, thoughtfully and systematically to build a culture of research and inquiry. It will require an educational leadership that has the capacity to rethink established orthodoxies and dominant practices; and ensure that resources are directed towards developing the skills of inquiry and research of all educators.

Recommendation 21:

That ASPA develop a policy position that reinterprets 'evidence-based' practice from being a simple context-free transfer of 'research' findings, to being the development of a system-wide culture of research and inquiry.

A culture that promotes and sustains the characteristics of public education¹⁴

One of the key insights emerging from the case study is that all citizens should possess the understandings, skills and dispositions to promote the common/public good in our society. That is, so many of the challenges today demand that people have a commitment to the collective good, rather than a sole interest in what will benefit the individual (Reich, 2018). But how is a disposition for the common good nurtured?

If the public good is arrived at through rational, respectful and critical deliberation among the public, then the quality of that participation in the public sphere is a function of the skills, understandings and dispositions that the public can bring to bear. And how is this quality assured? Our systems of education are the primary mechanisms through which the public is renewed (Feinberg, 2012). If they place a greater emphasis on the individual purposes of education than they do on its public purposes, then the public sphere can only be weakened as people lose the capacity to exchange views respectfully with each other and to think beyond individual interests. From a common-good perspective, the role of education is to maintain and improve the conditions for deliberation and debate in the public sphere.

It is this role that has been most neglected in educational discourse. The prevailing neoliberal ideology emphasising choice in an education market has downgraded education to a commodity largely benefiting individuals. As a consequence, it has reduced public education to being perceived as a safety net. A push-back against this dominating trend requires a clear articulation of what it means for public education to serve the common good. This will provide a reference point for policy and practice that foregrounds the public benefits of public education, and resists the trend to privatise it.

There are at least two key aspects to consider. The first is to create and maintain a system of education that itself models a commitment to the common good. This includes ensuring that education is available free to all on a comparatively equal playing field and on a non-exclusionary basis, and has policy and practices consistent with, and promoting of, the common good in education. The second aspect relates to the role of education for the common good. This involves schools developing the skills, dispositions and understandings of children and young people, such that they can engage – respectfully and thoughtfully – with others in deliberation about the common good in the broader society.

¹⁴ Since this paper is being written for ASPA, I am focusing in this section on public education. Private schools would need to interpret the characteristics in their own context. Some of the ideas in this section are canvassed in Reid (2016).

A number of the following characteristics are consistent with developing an education in and for the common good. The fact is that public schools are well positioned to sustain and build each of them because the characteristics are embedded in the very essence of public education. However, in many countries there have been various attempts over the past two decades to dismantle public education through overt privatisation programs, or through policies designed to make public schools behave as though they are private (Bonnor & Caro, 2007; Katz, 2013; Reid, 2016; Watkins, 2012). The case study demonstrates that such policies are counterproductive because they are destroying the very qualities and characteristics needed for education systems to meet the challenges of the future.

“...there must be a relentless focus on addressing equity in education in public systems.”

“An educational institution taking this task seriously will build into its culture an ongoing interrogation of its programs and activities against the central criterion of social justice.”

An ethical and socially just system and culture

Education is the most fundamental of human rights – it should not be apportioned according to parents’ financial capacity. Thus, while there will always be differences in educational outcomes, these should not be as a result of differences in parental wealth or influence. This means that there must be a relentless focus on addressing equity in education in public systems. This has, of course, been the rhetorical aspiration of educational institutions for decades. But it assumes a greater urgency in an era of a knowledge society where success, in school and beyond, will be largely determined by the capabilities students possess. An educational institution taking this task seriously will build into its culture an ongoing interrogation of its programs and activities against the central criterion of social justice.

A public education for the common good must create the conditions in which all children and young people can flourish. In particular, there should be strategies that accommodate those children and young people who have arrived at school from educationally disadvantaged backgrounds and require particular forms of support in terms of resources, teaching and learning. This support will often be additional to that offered to more advantaged students in an effort to establish an environment where educational outcomes are determined by effort and capacity, not birth. In a public system promoting the common good, issues would always be looked at from the perspectives of the least advantaged by giving them a genuine say in developing the policies and practices of schools and systems.

In addition, it is important to ensure that the formal and informal curriculum of schools model and practise a commitment to equity, and so develop young people with the understandings and commitments needed to work towards a more ethical, sustainable and socially just world.

A democratic system and school culture

The case study demonstrates the importance of capacities for democratic participation. As one of the key sites in Australian society for the development of these capacities, public schools and their systems must exemplify and practice democracy at all levels by ensuring that there are structures and processes that give an authentic voice to all. Sometimes, democratic decision-making in educational institutions is constructed as though it were an optional extra, something that can be tried once the bigger decisions have been made and things have settled down. And even then, watered-down versions of democracy are often established where a

bit of consultation conceals where the real power lies. But establishing democratic institutions can no longer be a matter of choice, or done half-heartedly. Surely, in conditions of uncertainty, a deliberative democracy that encourages deep and respectful dialogue from multiple perspectives is more likely to result in sound decision-making than one that assumes that wisdom resides in a person holding a position of responsibility.

If schools are to develop citizens who can participate actively in the public sphere; if they are to cultivate people who can work collaboratively with and respect others from diverse cultures; and if they are to foster the sort of trust that comes from genuine engagement by all those who are affected by decisions, particularly those with the weakest and most marginalised voices, then educational leaders must work to establish the conditions that allow democracy to flourish in their institutions. This commitment to democracy should also permeate the classroom and curriculum so that students develop the capabilities to play active roles in decision-making in civil society.

A culture of diversity and cohesion

Since public schools exist in every local community and are accessible to all, they are microcosms of that community, reflecting a rich diversity of cultures and socio-economic backgrounds. There are a number of benefits that flow from diversity being stitched into the fabric of every public school. For a start, local and international research demonstrates that the greater the social mix of a school, the better the academic outcomes. But beyond academic outcomes are the rich social and cultural learnings that accrue from students doing the hard work of learning from and through the diversity that is part of the daily life of a public school. This experience serves to stretch personal horizons beyond the familiar, encouraging the capacity to appreciate and respect difference, even while it contributes to enhancing the cohesiveness of a multicultural society. In brief, public schools provide spaces in our society where young people can be inducted into a civic culture of recognising and vigorously engaging with their differences. Rather than simply educating individuals, they turn a group of people with a host of differences into a civic entity called a public.

If, as the case study demonstrates, schools must prepare young people for an increasingly global and

mobile world, then it is important to maintain the diversity that comes naturally to public schools. It would be contradictory to cocoon students from diversity as happens in more homogeneous educational settings. And yet if Australia embraces educational choice through market-based approaches and vouchers in its public-school systems, it would face an increasing social and cultural stratification of our public schools (Ho, 2015). This must not happen to public education in Australia, as it has in countries like the US and England, which have been captured by the choice agenda.

A collaborative and community-based culture

The common good demands that people not only coexist peacefully but actually work together to achieve benefits for the whole community, rather than just for individual or special interest groups. This makes collaboration a central feature of a public education system focused on the common good. Public schools collaborate to achieve success and to build the strength and quality of the whole public system. In such a system, the failure of one school diminishes all schools. This means that rather than hiding good practice or ideas in order to preserve market advantage, the emphasis is on disseminating and sharing within and across schools. Such an approach also models to students how and why to collaborate for the common good. It would be inconsistent for a public education system to urge its schools to develop collaboration skills in its students, whilst forcing the same schools to engage in fierce competition.

Public schools also have the advantage of existing within the local communities from which their student population is drawn, and so there is a strong bond between schools and their communities. Such close links enable each community to use the facilities and resources of its public school to enhance local community life; and each public school to use the resources of the community in its learning programs – to the benefit of both school and community. Policies that ignore community links – such as those that allow choice between public schools and so promote people travelling across communities to get to their chosen school – destroy the considerable learning and community benefits that accrue from the localness of public schools.

“One of the biggest challenges facing educators today is how to develop a curriculum (including approaches to teaching and learning) that meets the individual needs of students by personalising curriculum, as well as ensuring that all students are prepared for the demands of the contemporary world.”

A culture of innovation

One of the biggest challenges facing educators today is how to develop a curriculum (including approaches to teaching and learning) that meets the individual needs of students by personalising curriculum, as well as ensuring that all students are prepared for the demands of the contemporary world. The challenges include the rapidity of technological change, the creation of new economies, the increasing mobility of people, and the fact that communities are more culturally and ethnically diverse than they have ever been. The scale and pace of this change means that schools must constantly adapt to meet the new demands, making creativity and innovation in designing for the future important aspects of education. As a result, approaches to innovation need to be more systematic and extensive than they have ever been. Given that public schools serve the vast bulk of students in our community (including the vast majority of students who are educationally disadvantaged), it is the public sector that must take the lead in developing, trialling and implementing innovative practice in such areas as teaching and learning, school organisation and community interaction. That is, public systems should be at the cutting edge of innovation in educational practice, while also seeking to develop capabilities for innovation in students. A more privatised public system is less likely to promote innovation. The pressure of market competition can often lead to a culture of copying those schools that appear to be successful, which leads to homogeneity and conformity of practice.

“...public systems should be at the cutting edge of innovation in educational practice, while also seeking to develop capabilities for innovation in students.”

Building a culture that promotes and sustains the characteristics of public education

To support a culture that is based on and sustains the essence of public education, it would be important for public education systems to articulate the key characteristics of public education, and work to ensure that policy and practice is consistent with them¹⁵. To start this process a professional association like ASPA could develop a resource and/or run a conference on one of the characteristics, sharing ideas about what schools are doing and deepening understandings about the characteristic.

Recommendation 22:

That ASPA works with other public education professional associations to lobby public education systems to develop a statement articulating the characteristics of public education.

Recommendation 23:

That ASPA develops a resource and/or runs a conference on one of the characteristics of public education, sharing ideas about what schools are doing and deepening understandings about the characteristic

¹⁵ In 2017 South Australia developed a Statement on Public Education, signed off by the Minister for Education, and the Education Department's Chief Executive (Reid, 2017). This could serve as an example for other jurisdictions about what is possible. In addition, SASPA (South Australian Secondary Principals' Association) is developing a resource based on the Statement, which will share some powerful school-based examples of the characteristics in action.

Summary

The importance of developing cultures consistent with and supportive of the educational changes proposed in Part D cannot be overstated. In this section I have suggested a number of cultural characteristics that are not only sympathetic to, but would positively promote that educational agenda. I have argued that it is just as important for a whole education system to ensure that its policies and practices do not contradict proposed changes, as it is for individual schools to do so. Without taking this step seriously, no amount of new policy will disrupt entrenched educational practices.

“The basic premise of the paper is that if the future is really unknown and unknowable, then the only way to plan for it is to use a process that enables educators and policymakers, in an ongoing way, to understand, monitor, evaluate, and assess broad societal trends and the changes they are bringing.”

AFTERWORD:

Some reflections on the process and on school leadership

The process and its possibilities

This paper began with the assertion that there are two competing discourses in Australian education. The dominant discourse is standardising, and favours certainty, uniformity, competition and regulation in education policy. The less dominant discourse is futures-focused and prizes flexibility, adaptability, collaboration and agility. I argued that if Australia is to meet the challenges of the future, ways must be found to shift from a discourse of certainty to one that embraces the complexity, ambiguity and uncertainty of contemporary times.

The basic premise of the paper is that if the future is really unknown and unknowable, then the only way to plan for it is to use a process that enables educators and policymakers, in an ongoing way, to understand, monitor, evaluate, and assess broad societal trends and the changes they are bringing. Only then is it possible to identify the kinds of educational approaches that might best meet the challenges of the future. Such a process, I argued, could break the stranglehold of the standardising approach to education policy by providing the evidence needed to substantiate policies and practices that are better suited to the changing environment of the 21st century.

Certainly the model helped to identify the contours of an official curriculum and pedagogy that meet the challenges of the future; and it clarified the kinds of obstacles that need to be addressed, and cultures that need to be instantiated, if the change proposals are to be more than wishful thinking.

But the strength of the model lay with the detailed analysis of a key societal trend; the case study of the third/fourth industrial revolution. Not only did the analysis identify the capacities that are the task of educational organisations to develop for the 21st century, but it provided a very strong case for the kind of agenda proposed. For example, it would be difficult for a policymaker to deny the importance of interdisciplinary learning, or the need for a focus on meta-learning, in the face of the evidence revealed by the case study. Vague assertions about rigour or the need for a single approach to teaching would not suffice.

The question of whether or not the model could be the basis of system or school-wide planning is one readers will have to assess. There are many possibilities, including one which would be consistent with the development of a culture of research and inquiry suggested in Part F. That is, in the long run the process could contribute to a new way for systems to function and plan. Thus, at the school level it could be used as the basis for a discussion about curriculum and pedagogy, with policy and/or practices being modified or changed as a result. At the system-wide level, there could be an aggregation of ideas emerging from schools, with the system responding by providing resources, offering relevant professional development programs, changing policy, or altering the official curriculum. In other words, the process suggests a way to establish a more dynamic relationship between schools and systems – one based on partnership, rather than the current mode of top-down imposition.

Reflections on leadership for the future

The model developed and used in this paper has helped to clarify the kind of educational leadership that is needed into the 21st century. There are many leadership models, and it would be pointless to summarise these. School leaders have always had to deal with the exigencies of such practical matters as resources, parent and school communities, human resource questions, student management, curriculums and so on. But if the case study does anything, it shows that, like it or not, education is a highly political activity – not least because it deals in knowledge, a precious currency and therefore strongly contested.

“...it has never been more important for educators to engage in the public debate at the state, national and global levels.”

“...rather than wait and then react, educators must become involved in shaping public opinion and policy directions.”

There are many groups that want to exert influence on governments to shape education policy in ways that serve their interests. And yet educators have tended not to become engaged in the political process. At a time when international comparisons are being made and education policies are being constructed on the basis of test results, and when state and territory governments are trying to work out how best to structure and organise educational systems to meet contemporary challenges, it has never been more important for educators to engage in the public debate at the state, national and global levels.

Schools cannot be seen as stand-alone institutions, free from political issues, because the decisions that are made at various levels of policy affect what happens in classrooms. That is, rather than wait and then react, educators must become involved in shaping public opinion and policy directions. This sort of political engagement starts at the school and local community level. In my view, it is the responsibility of educational leaders not only to keep abreast of contemporary trends and debates, but to develop ways by which the school community can contribute to these on a regular and systematic basis.

For these reasons and on the basis of what the case study reveals, in the 21st century, school leaders in public systems must be able, democratically and collegially, to:

- understand and lead discussions involving educators, students and school communities about broader social, political and cultural trends, and identify the implications for schools
- be curriculum and pedagogical leaders who can use the curriculum expertise residing in their staff to generate informed, lively, respectful and ongoing curriculum discussion and debate
- lead the creation and maintenance of a culture of research and inquiry
- identify, and work democratically to address, blockages to agreed curriculum and policy changes
- understand and contribute to system-wide policy development
- advocate for and model the characteristics of public education, including a commitment to equity, diversity and cohesion, collaboration, democracy and innovation.

The development and practice of such an approach to leadership is one that cannot be achieved without collegial and resource support. This makes the role of professional bodies like ASPA crucial to the success of the kind of educational program that has been recommended in this paper, and thus to Australia's educational futures.

SUMMARY OF RECOMMENDATIONS

Recommendation 1:

That ASPA urges the Education Council to embark on developing the next iteration of the Goals of Schooling in 2018.

Recommendation 2:

That ASPA urges the Education Council to use consultation processes that deeply engage the profession during the development of the next iteration of the Goals of Australian Schooling.

Recommendation 3:

That during the development process of the next iteration of the Australian Goals of Schooling, ASPA submits to the Education Council that the document begin with a detailed outline of the agreed purposes of education, and that these purposes guide and inform the development of the goals and strategies that follow.

Recommendation 4:

That ASPA and/or its state and territory affiliates selects a major social, political, environmental or economic trend to be the focus for a conference at which the proposed six-step process is modelled.

Recommendation 5:

That ASPA considers the capacities identified in the case study in this paper, and arrive at what it considers to be the key components of a contemporary curriculum. Such an agreement would inform ASPA's stance towards national curriculum issues.

Recommendation 6:

That ASPA, individually or in collaboration with other professional associations, showcases – through resources or community exhibitions – the interdisciplinary work that is currently taking place in schools around Australia, with particular emphasis being placed on the importance of discipline-based study to such work.

Recommendation 7:

That ASPA urges ACARA to examine how it might modify the Australian Curriculum to provide signals about where interdisciplinary study might be used at different points in the learning sequence. This could involve identifying possible connections and relationships within and between key concepts in various disciplines, and providing resources to support teachers and students in planning and implementing interdisciplinary study.

Recommendation 8:

That ASPA urges ACARA to consult about and develop a rigorous understanding of how equity is understood in the Australian Curriculum, and then amend the Australian Curriculum on the basis of the policy developed.

Recommendation 9:

That ASPA, in conjunction with university partners, applies for funds to develop and research an approach to curriculum that incorporates the lifeworld knowledge of students from educationally disadvantaged backgrounds.

Recommendation 10:

That ASPA suggests to the Education Council that the process for developing the national Goals of Schooling each decade should include adding to or modifying the extant list of general capabilities.

Recommendation 11:

That ASPA urges ACARA to develop a resource that describes the conceptual basis of the general capabilities including their purposes, relationship to the learning areas, and role in the curriculum.

Recommendation 12:

That ASPA urges ACARA to commission a project that tracks what is happening with the general capabilities in Australian secondary schools; identifies problems and possibilities; and proposes what might be done to advance the teaching for, and assessment of, general capabilities.

Recommendation 13:

That ASPA or its state-based affiliates conducts a conference which focuses on one of the general capabilities, explores what it means, shares what is happening in secondary schools in teaching and assessing for it, and identifies what further support is needed to advance the capability agenda.

Recommendation 14:

That ASPA urges the Education Council to accept the spirit of Recommendation 7 of the Gonski 2.0 report, but reject adopting the recommended single 'progression levels' approach, and instead supports trials of different approaches to teaching, assessing and reporting on the general capabilities.

Recommendation 15:

That ASPA advocates for a research project to develop a coherent meta learning framework and associated resources. This should involve collaboration between researchers representing the spread of research into various aspects of learning, and educators with a knowledge of pedagogy and curriculum design.

Recommendation 16:

That ASPA explores with the Australian Institute for Teaching and School Leadership, and state/territory education departments, the idea of a teaching and learning framework to inform and guide professional discussion and practice.

Recommendation 17:

That ASPA agrees on a pedagogical framework that captures the key elements of teaching and learning, and provides a platform enabling it to speak back against 'research' that over simplifies the complexity of teaching.

Recommendation 18:

That ASPA urges the Education Council to reject Recommendation 11 of the Gonski 2.0 report, and instead establish a project to evaluate different approaches to personalised learning currently being used in Australian schools.

Recommendation 19:

That ASPA advocates publicly, and to the federal government, for a review of PISA which investigates the validity and reliability of the tests and their impact on Australian education.

Recommendation 20:

That ASPA collaborates with other professional associations to convince state/territory governments and the federal government to trial different ways to assess educational outcomes which are more educative than standardised tests.

Recommendation 21:

That ASPA develops a policy position that reinterprets 'evidence-based' practice from being a simple context-free transfer of 'research' findings, to being the development of a system-wide culture of research and inquiry.

Recommendation 22:

That ASPA works with other public education professional associations to lobby public education systems to develop a statement articulating the characteristics of public education.

Recommendation 23:

That ASPA develops a resource and/or runs a conference on one of the characteristics of public education, sharing ideas about what schools are doing and deepening understandings about the characteristic.

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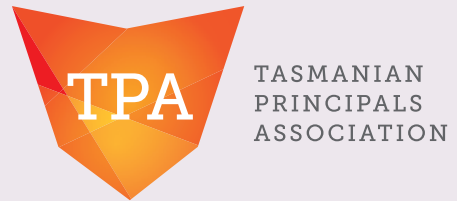
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