

Why we need to stop talking about twenty-first century skills

Bill Lucas

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Imagining futures

twenty-first century

adj.

characteristic of the imagined conditions of the twenty-first century.

Oxford English Dictionary (OED)

It is a characteristic of human beings to want to look ahead and think about what might happen next. Indeed our capacity to anticipate and plan for new experiences is, at least in part, why we have evolved as a species so successfully.

So it was entirely natural that, as the year 2000 dawned, with all the extra pizzazz of it being a millennium milestone, the futurists got to work. Buoyed up by the potential for the so-called ‘millennium bug’ to shut down virtual civilisation as we knew it, and driven by genuine uncertainties about the opportunities afforded by the invention of the World Wide Web in the 1980s, speculation about what this might mean for society in general and schools in particular was rife.

In 1998 Google was invented and the two decades that followed saw the birth

of Facebook (2004), Twitter (2006) and Instagram (2010). Surfing on this wave of human inventiveness were, and are, the many tech companies that enable these digital breakthroughs to flourish. It was and is in the interests of such companies to suggest that their products provide solutions which bricks and mortar schools cannot. The marketing device to create the necessary sales climate in education was the idea of ‘twenty-first century skills’.

According to the OED the first use of the phrase ‘twenty-first century’ was by novelist Dick Barton in 1964. However, with the sense that it has when linked with ‘skills’, its earliest outing was by the Royal Society of Arts in London, in its journal in 1980, in the sentence ‘Everyone in the country must adapt to twenty-first century living and working patterns.’

For the last four decades the phrase ‘twenty-first century skills’ has become ubiquitous. At its core, ‘twenty-first century skills’ suggests that

1. there are some skills that are especially relevant to the twenty-first century;
2. by implication, these skills are different from those which we needed in the twentieth century; and
3. these skills are somehow relevant for a whole century.

Commonly identified twenty-first century skills include critical thinking, creativity, metacognition, problem solving, collaboration, motivation, self-efficacy, consciousness and perseverance (Lamb et al, 2017).

Over the past decades ‘twenty-first century skills’ has become a widely, and uncritically accepted, educational meme. The phrase has gathered many associations with it, including ideas that

- a digital, technology-driven world requires some students to learn new skills;
- classrooms in schools no longer have walls, given the global reach of technology;
- with technology, knowledge is much less important if it can be acquired by searching the Internet;
- direct instruction by teachers is no longer relevant;
- in a world with so much data available, knowing too many things might be a waste of cognitive space; and
- learning is life-long more than it is school-based.

The notion of twenty-first century skills both delights and infuriates. As a thinking frame for considering the role of schools in rapidly changing times, it seemed helpful at first, seemingly inviting educators to

ask profound questions about learning. Four decades on, the phrase is increasingly irritating. Its use of the word ‘skill’ is unhelpful. Its refusal to distinguish between skills that are **eternally** useful, as opposed to those which are legitimate responses to the world we live in **now**, is lazy. Also it distracts from a much more interesting question: ‘What makes a good learner?’ In the same period that twenty-first century skills have been around as an idea, we have developed considerable new understanding from the learning sciences about what it is to be a powerful learner, as well as which methods work best to cultivate such individuals.

A legitimate concern about what skills students might need today has gradually morphed into a mantra and, more recently, into an uncritical movement. The danger with this mutation is that the words have acquired an evangelical fervour and started to put off the very people who need to be considering their role today, the majority of thoughtful teachers across the world. For this group twenty-first skills can seem jingoistic, simplistic or distracting.

The problem with the language of skill

skill

noun

the ability to do something well; expertise.

OED

There are many kinds of skills that we might want young people to acquire. Some of these will serve them well at school and in examinations – accurately retrieving and transcribing information acquired months ago, sitting still for protracted periods of time, writing certain kinds and amounts of text against the clock. Some will be useful in later life – reading a map on paper or on a device when you are lost; asking for

A legitimate concern about what skills students might need today has gradually morphed into a mantra and, more recently, into an uncritical movement.

help when stuck; working with people from different cultures and backgrounds. Some have value in both contexts.

At its simplest, a skill is a ‘learned capacity to do something useful’ (Lucas and Claxton, 2009). However, the word ‘skill’ can somehow seem too unsubtle a concept to distinguish between, say, tying your shoelaces or judging the relative veracity of a primary historical source and a Wikipedia entry. For this reason the notion of ‘wider skills’ (Lucas and Claxton, 2009) seems helpful. It is suggestive of lifelong value, something which might be of use in different contexts. A decade later, the Brookings Institute is using a similar idea in talking of the need for a ‘breadth of skills’.¹

Those using the idea of twenty-first century skills are often reaching towards the idea of wider or broader skills. However, at the same time as the phrase has been in use, the world has witnessed an extraordinary proliferation of words and phrases seeking to capture these elusive concepts. These include – alphabetically – ability, attribute, capacity, capability, character, characteristic, cognitive skill, competence, competency, cross-functional skill, disposition, habit of mind, non-cognitive skill, skill, soft skill, trait, transferable skill, transversal skill and wider skill.

Since the Melbourne Declaration (MCEETYA, 2008), Australia has chosen to use the word ‘capability’. The Organisation for Economic Co-operation and Development (OECD) uses the word ‘competency’. Psychologists tend to use ‘trait’, which for many implies a certain fixedness. Employers often refer to ‘soft’ skills, unhelpfully diminishing their importance. Economists and some educational researchers use ‘non-cognitive’, which perpetuates an unhelpful distinction between cognitive (ie, relating to mastery in an academic subject) and non-cognitive (ie, more akin to ‘soft’ social skills). Those in one branch of education conceiving a more expansive purpose for schooling use the word ‘character’ to indicate their interest in all-rounded education with an explicitly moral dimension.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) uses a most cumbersome expression, ‘transversal skills’ (Care and Luo, 2016), while the meaning of the phrase ‘transferable skills’ is helpfully clear in its intention. Various educators have used the notion of ‘habit of mind’ (Resnick, 1999; Costa and Kallick, 2002) and ‘disposition’ (Perkins, 1995; Claxton, 2004; Lucas et al, 2013). Figure 1 expresses this word soup diagrammatically.

Employers often refer to ‘soft’ skills, unhelpfully diminishing their importance.

Figure 1. The varied language of skills



Each term comes freighted with associations, but unless we can define what we are seeking to discuss, we are unlikely to be able to teach or assess it well. Terms like ‘knowledge’ and ‘skill’ have established meanings, but teachers are put off by the proliferation of vocabulary in this field and can easily assume that it suggests a lack of rigour and evidence.

Recently the OECD (2016) has offered a model of education for the decade ahead, which seeks to show the relationships between knowledge, skills, attitudes and values (see Figure 2). In the OECD model knowledge, skills, attitudes and values are seen as interconnected and interacting to produce competencies. Capabilities or competencies are, in effect, knowledge, skill, values and attitudes in action.

Of particular note in the OECD model is the recognition of the nuances within the words ‘knowledge’ and ‘skills’. ‘Knowledge’ is explicitly interdisciplinary **as well as** disciplinary. ‘Skills’ are cognitive **and** metacognitive, **as well as** being social and emotional. Both ‘knowledge’ and ‘skills’ have a **practical** component. There is, arguably, one more conceptual stage beyond ‘capabilities’ or ‘competencies’, suggesting that the outcome of schooling

is not only about being capable within school, but also about routinely deploying capabilities in a range of real-world settings. Figure 3 on page 6 shows this progression.

A ‘capability’ is a cluster of knowledge and skills, an interweaving of knowledge, skills, attitudes and values that form the competencies that drive actions. A ‘habit’ or ‘disposition’ is all of these **and** their routine deployment in a range of different contexts.

Take perseverance as an example. You might know that it is useful and that it involves dealing with feelings when you are stuck. You might have developed skills such as being comfortable with ambiguity and asking for help. You might be seen as a capable ‘perseverer’ by one of your teachers when working, for example, with maths equations. However, unless you routinely choose to deploy your persevering capability in a range of settings, it is not something that you are routinely disposed to use.

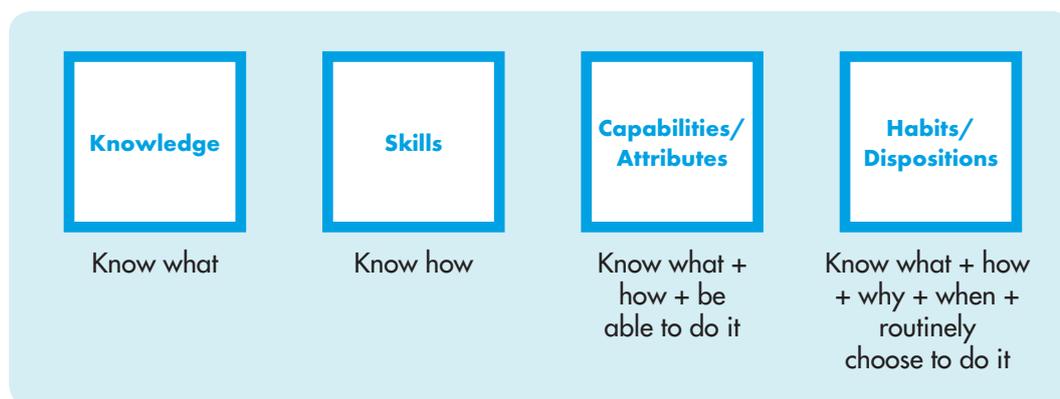
The language of twenty-first century skills can so easily perpetuate a misunderstanding about how knowledge and skill are applied in the real world, underestimating the role of habit and context.

teachers are put off by the proliferation of vocabulary in this field and can easily assume that it suggests a lack of rigour and evidence

Figure 2. The future of education and skills: OECD Education 2030 Framework



Figure 3. From knowledge and skills to dispositions via capabilities (Lucas, 2017)



Lazy thinking

If the language of skills is unhelpful, so too is some core thinking behind their association with the twenty-first century. I recently came across a book, (Kletzing and Kletzing, 1898) written at the dawn of the twentieth century in the USA. It extols the importance of certain wider skills or character attributes including: adaptability, concentration, energy, grit, patience, perseverance, persistence and self-control. It is an astonishingly modern-seeming list, especially with the inclusion of adaptability and grit.

The point of my observation, however, is that it was written more than a hundred years ago. The Kletzing brothers might have marketed their character attributes as a set of new twentieth century skills, of the kind that all schools should be promoting as the world moved on from the industrial revolution of the nineteenth century, but they did not. They simply argued for their enduring importance.

Wind the clock back still further to the 6th century BC and look at Confucianist thinking in China. It overlaps uncannily with the kinds of twenty-first century

skills represented in, for example, the Partnership for 21st century learning framework (Trilling and Fadel, 2009). With the assistance of Chinese scholar Leonard Tan's 2016 paper, *Confucius: Philosopher of Twenty-first Century Skills*, you might be intrigued to appreciate the timeless elements of these wider skills that were valued two and half millennia ago. Such skills included deep critical thinking, synthesising, the application of knowledge, communication, collaboration and the patient questioning associated with creativity. There is one difference interestingly. Where a goal of contemporary creativity might be real-world innovations with monetary value, for Confucius creativity was strictly an ethical endeavour to make a better world.

From these two examples, one American, one Chinese, it is clear that the defining aspect of any grouping of 'skills' is their usefulness, not the time in which they were conceived. So for the twenty-first century tag we would need to understand more precisely what has changed from, say, the end of the twentieth and the start of the twenty-first century, which calls on schools to cultivate different skills.

If the language of skills is unhelpful, so too is some core thinking behind their association with the twenty-first century.

Reaching a consensus as to what is and is not likely to be different in the coming years is contentious territory, but most commentators agree about some of the main trends. These include

1. the increasing complexity of problems such as climate change, global migration and growing resistance to life-saving drugs;
2. the ubiquity of data – it was never possible for schools to teach everything and these days they are selecting from an ever-expanding menu;
3. the proliferation of knowledge sources from the Internet and wider digital world;
4. the increasing interconnectedness and global nature of our relationships;
5. the potential of automation via Artificial Intelligence and its impact, often contested, on life and work;
6. increased self-employment; and
7. an ageing society.

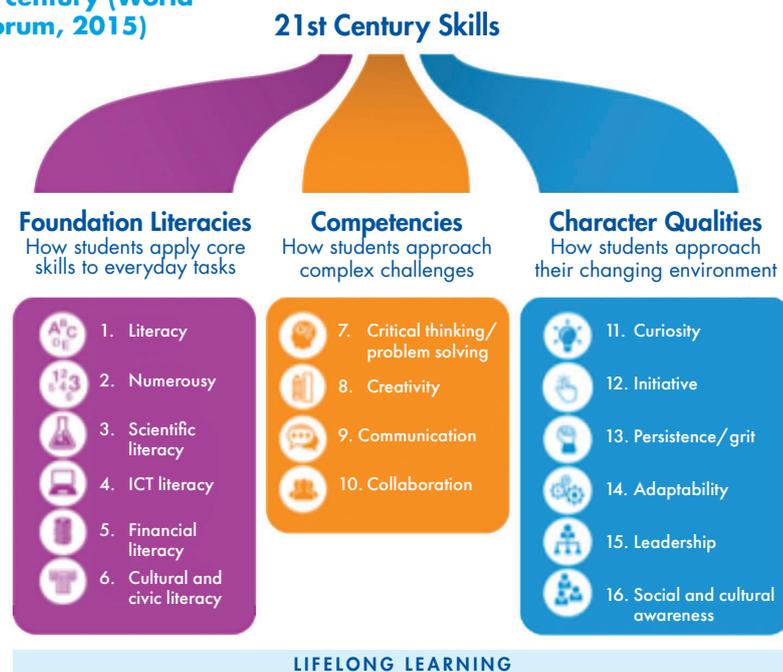
In direct response to each of these elements it can be argued that the kinds of capabilities, competencies or dispositions that we need are likely to include

1. complex problem-solving that is frequently multi- and inter-disciplinary by nature and always ethically driven;
2. critical thinking and high-level project and time management;
3. digital literacy, design and computational thinking;
4. intercultural collaborative problem solving and emotional and social intelligence;
5. creativity, adaptability, metacognition;
6. creativity, communication, adaptability; and
7. learning to learn.

While each disposition broadly maps on to its equivalent number, it is not so simple; the categories are much more permeable.

The World Economic Forum (WEF) response over a number of years now has been to describe the kinds of skills needed as shown in Figure 4.

Figure 4. 16 skills for the twenty-first century (World Economic Forum, 2015)



Like any framework, the WEF's has advantages and disadvantages. On the plus side it is a sensible and evidence-based list, albeit with a critical omission – metacognition or learning to learn. Its three categories of literacies, competencies and character qualities raise questions and provide answers. Positioning ICT as a core literacy makes sense but the absence of an explicit interest in being ethical (something the Australian Curriculum includes with its Ethical Understanding capability) is curious.

The four competencies all make good sense, but the character qualities are something of a muddle. Curiosity sits much more naturally with the competencies, and having grit and leadership in the same grouping creates an 'apples and pears' issue of putting two items of different scope and kind together. Adaptability is clearly a core disposition for anyone seeking to deal with a changing environment.

With Guy Claxton I have wondered whether it is more helpful to think about these kinds of things in terms of being most related to being a good learner (epistemic) or a good person (prosocial) (see Table 1).

Take away the title of Figure 4, Twenty-first century skills, and the list makes more sense. For the foundational literacies are

not skills in the sense that most people understand them. They are bodies of knowledge from which useful skills can be derived and developed. Combine the WEF's competencies and character qualities and you have a set of useful topics that can each be framed as dispositions, ways of thinking and being, which, taken together, are likely to produce well-educated young men and women.

The final laziness of framing skills (or competencies for that matter) as applying to a whole century is obvious but irksome. If an underpinning argument is that we are in turbulent, fast-moving times and need a changed set of skills, then it is plainly silly to assume that what we need to learn now is the same as what we will need to learn in 10 or 30 or 80 years from now.

This problem of imprecise thinking applies especially to the most obviously new aspect of recent life, the digital world into which we ventured sometime in the last few decades of the twentieth century, the move from tape cassettes and cds to digital downloads, diaries to blogs and vlogs. Whether the digital world requires new skills *per se*, as opposed to new or significantly different skills used in a digital environment, needs careful exploration.

Whether the digital world requires new skills *per se*, as opposed to new or significantly different skills used in a digital environment, needs careful exploration.

Table 1. The 'moral' and 'learning' aspects of capability

Prosocial	Epistemic
▪ Kind (not callous)	▪ Inquisitive (not passive)
▪ Generous (not greedy)	▪ Resilient (not easily defeated)
▪ Forgiving (not vindictive)	▪ Imaginative (not literal)
▪ Tolerant (not bigoted)	▪ Craftsmanlike (not slapdash)
▪ Trustworthy (not deceitful)	▪ Sceptical (not credulous)
▪ Morally brave (not apathetic)	▪ Collaborative (not selfish)
▪ Convivial (not egotistical)	▪ Thoughtful (not impulsive)
▪ Ecological (not rapacious)	▪ Practical (not only 'academic')

A recent systematic review of the relationship between ‘21st century skills’ and digital skills (Van Laar et al, 2017) exemplifies this problem. The authors rightly identify the various technical skills involved in using devices and navigating online worlds, as well as some specific information management issues relating to searching, selecting and organising data. Then, however, they uncritically list communication, collaboration, creativity, critical thinking and problem solving, as if these are now required **because of** the demands of online living.

It is certainly arguable that the Internet requires constant application of critical thinking skills to sift evidence from assertion, and that its reach demands real-time and asynchronous collaboration with people across the world. However, these skills are valuable in and of themselves and have been for many centuries.

A growing consensus about dispositions for success in life and learning

While the debate about twenty-first century skills has been going on, a quiet consensus has been emerging about the kinds of dispositions that young people need to get on at school and beyond. The five lists in Table 2 are indicative.

Each of these seven or so wider skills or capabilities frameworks has been drawn from research – research from fields spanning employment, technology, education, psychology, education and the learning sciences. There are many more and these five are illustrative only.

The point of including them is simply to show the considerable overlap that exists.

Table 2. Skills for a lifetime of learning

European Parliament 2007, Key Competences for Lifelong Learning	Pellegrino and Hilton 2012	Gutman and Schoon 2013	Heckman and Kautz 2013	Lamb et al 2017
<ul style="list-style-type: none"> ▪ Communication in mother tongue ▪ Communication in foreign languages ▪ Digital competence ▪ Learning to learn ▪ Social and civic competencies ▪ Sense of initiative and entrepreneurship ▪ Cultural awareness and expression 	<ul style="list-style-type: none"> ▪ Critical thinking ▪ Information literacy ▪ Reasoning ▪ Innovation ▪ Intellectual openness ▪ Work ethic ▪ Conscientiousness ▪ Positivity ▪ Communication ▪ Collaboration ▪ Responsibility ▪ Conflict resolution 	<ul style="list-style-type: none"> ▪ Motivation ▪ Perseverance ▪ Self-control ▪ Metacognitive strategies ▪ Social competencies ▪ Resilience and coping ▪ Creativity 	<ul style="list-style-type: none"> ▪ Perseverance ▪ Self-control ▪ Trust ▪ Attentiveness ▪ Self-esteem and self-efficacy ▪ Resilience to adversity ▪ Openness to experience ▪ Empathy ▪ Humility ▪ Tolerance of diverse opinions ▪ Engaging productively in society 	<ul style="list-style-type: none"> ▪ Critical thinking ▪ Creativity ▪ Metacognition ▪ Problem solving ▪ Collaboration ▪ Motivation ▪ Self-efficacy ▪ Conscientiousness ▪ Perseverance

Such wider skills can grow into capabilities or competencies, which can become any learner's default dispositions, learned and then practised in many different contexts.

Such lists remind us that how you are disposed to think about things is important. It matters whether, for example, you believe working in groups with many different viewpoints is a good idea, or whether you assume that mistakes are a natural part of learning, which therefore calls on perseverance.

Apart from the word digital in the European Key Competences, these wider skills are far more timeless than they are of the twenty-first century. Also there is widespread agreement that there is a set of dispositions – knowledge, skills and capabilities routinely and often non-consciously deployed – which are useful both in the tests of school and of life.

The real challenges for schools

So what is different or noteworthy about the century into whose third decade we have nearly slipped?

New digital technologies, clearly, have a major impact. They contribute ceaselessly to the production of data and enable almost every nook of the world to be interconnected.

An exploding world population and an inequity of resource distribution, coupled to certain aggressive belief systems and a growing concern about the impact of climate change has, arguably, created some of the most complex and seemingly intractable problems for human beings to wrestle with.

We are all living longer; babies born today are likely to live until they are 100 years old (Gratton and Scott, 2016). The old formula of school–work–retirement is over, with the potential for us not to see front-loading our lives with learning in quite the same way. While the pattern globally is towards employment as the prevailing labour market model,² in some countries – the UK is a good example – there is a significant move towards being self-employed; towards the gig economy as it has been called. The number of self-employed workers has increased from 3.3 million in 2001 to 4.8 million in 2017, according to the Office for National Statistics.³

It is possible to see how an aspect of each disposition might be redefined by or made more useful for dealing with current challenges and, therefore, how it might impact on what schools do. Using the most recent of the five frameworks in Table 2 (Lamb et al, 2018) as an exemplar, they might be refined as follows.

- Critical thinking – The proliferation of digital data, often with unclear affiliations and uncertain reliability, makes critical thinking even more important than it always has been from the days of the newspaper and the street corner soap box.
- Creativity – Complex problems and an increasingly self-employed workforce call for fresh, innovative thinking, the making of new connections. Creative thinking leads to the generation of financial and human capital; it is a core differentiator between human beings and increasingly smart machines, in a world where AI is exercising growing influence.

Also there is widespread agreement that there is a set of dispositions – knowledge, skills and capabilities routinely and often non-consciously deployed – which are useful both in the tests of school and of life.

Increasingly we will need to focus more on **how** rather than **whether** learners deploy their effort, to notice the strategies they use to persevere in the face of difficulty.

- Metacognition – Thinking about how we learn in a range of contexts is essential if we are to be active learners beyond school and to improve our own capabilities throughout our lives. Being able to learn whatever we want to throughout our life is more important the longer we live.
- Problem solving – The kinds of problem solving we need today call for deep interdisciplinary and intercultural understanding, and the ways in which individuals and teams across the world can use both online and face-to-face interactions to work with complex challenges.
- Collaboration – Without collaborative working we would not, for example, have created the Hadron Collider or unravelled the human genome and gone on to create the National Geographic Genographic Project.⁴ Neither will we be able to think through how to deal with complex issues like climate change or food security or the migrations resulting from wars and economic depression. It is axiomatic that complex or ‘wicked’ problems call for collaborative and interdisciplinary working as well as deep knowledge of one or more domains.
- Motivation – Seeing a goal through to its conclusion, or at least to a next stage, has always been important; these days the opportunities for distraction are enormous, not least from social media. Recent research by McKinsey (Denoël et al, 2018) using the extensive PISA student database found that ‘calibration motivation’, ‘the ability to identify what motivation looks like in day-to-day life (including doing more than expected and working on tasks until everything is perfect)’, is even more important than home background in predicting achievement.
- Self-efficacy – A learner’s belief in her/his own agency, along with motivation and self-regulation, is of timeless importance. What has changed in the last few decades is our recognition of its importance and better understanding of the mechanisms by which it works. Carol Dweck (2006) has shown that ‘growth mindset’ is central to good learning. The belief that mistakes are a good thing – prototypes or early drafts on the way to a better performance – represents a significant shift in our understanding. Dweck’s research has shown us that what matters is to focus on the way learners deploy their discretionary effort, on their learning strategies.
- Conscientiousness – This personality ‘trait’ has historically been strongly associated with achievement. Perhaps because it is one of the ‘big 5 personality types’ it is sometimes seen as fixed or heritable. In fact, the best estimate of its heritability is 40–50 per cent (Roberts and Jackson, 2008), meaning that it is very much something that is learnable.
- Perseverance – One of a large number of important attributes associated with tenacity (Lucas and Spencer, 2018), including persistence and grit, this has a long association with successful learning as we saw earlier. What has changed is the way in which it has moved from being thought of as something largely inherited to a disposition that you can learn and develop. Historically many schools have used ‘achievement’ and ‘effort’ as the two ways in which they report to parents on their children’s progress. Increasingly we will need to focus more on **how** rather than **whether** learners deploy their effort, to notice the strategies they use to persevere in the face of difficulty.

Whatever we call ‘twenty-first century skills’, there is growing agreement that there is a set of near-timeless dispositions which, taken together, make a powerful learner.

Hidden within this broad consensus there are two aspects of school life that are still undervalued: group activity and oracy. Despite the inclusion of collaboration in many contemporary frameworks, it being an underpinning idea of the World Wide Web and a focus on collaborative problem solving by PISA (OECD, 2017), students are only ever, in most schools, assessed as individuals. The nearest they get to their collaborative efforts being appreciated are when they are on the sports field or in drama, music or dance performances. Yet in the workplace team and group interactions count for much more.

In similar vein, although they may from time to time be asked to give a talk or contribute to a debate, the widespread focus on literacy seems to be contributing to an undervaluing of the importance of oracy. Digital skills such as TED-type talks and the production of YouTube-like channels can both be ways of developing aspects of oracy, but there is a more fundamental shift needed by schools to understand the complexity and richness of this area. One school in the UK, School 21, in partnership with the University of Cambridge, has made significant strands here.⁵

The cause of these two imbalances may be as simple as the fact that pupils are assessed as individuals and almost everything that is valued in schools is validated by analysing writing – often against the clock – not speaking.

A further challenge for schools is that everything is framed by school timetables which, the world over, are dominated

by short chunks of time called lessons, which take as their identifier a subject or discipline such as Maths or Geography or Dance.

The problem is not that subjects focus our minds on knowledge. That is a good thing. Knowledge matters, and the wider skills described thus far need to sit within knowledge domains and within more messy real-world contexts. Neither is the problem a new one; good teachers have for a long while rued the moment when the interests of their students seem to be being limited by staying within the boundaries of a syllabus or subject discipline. The problem is that, from a very early stage in school, pupils can easily see the world in terms of the subjects that appear on their timetable.

The phenomenon of the school timetable is in part good sense, in that novice learners need to get on top of some basic knowledge before they tackle its interrelationship with other domains. However, to have a school system predicated on increased isolated specialism is counter-intuitive. It also goes against what we are learning about the wider concept of cognitive apprenticeship, which focuses more on understanding the relationships between knowledge systems, and how a better understanding of this can help to improve the transfer of learning from one context to another, surely the Holy Grail of all school systems.

One helpful way of thinking about the balance between deep knowledge and helpful learning dispositions is the idea of ‘T-shaped’ learners. T-shaped is a metaphor to suggest that as well as deep knowledge in one or more areas (indicated by the stem of the letter) today’s learners need a range of dispositions as well (the horizontal line in the letter).

the widespread focus on literacy seems to be contributing to an undervaluing of the importance of oracy.

Many schools are still organised as if the goal is, to continue the letter metaphor, to produce either ‘T’ shaped learners, with ‘knowledgeable about a few subjects, or ‘–’ shaped, confidently generalist in many domains – what is often referred to by school leaders as the result of a broad and balanced curriculum. The devil is in the detail here and the language we use is important. It is more complex than an ‘either knowledge or skills’ argument and the ‘T’ metaphor is not unhelpful in reminding us of the important role of wider skills.

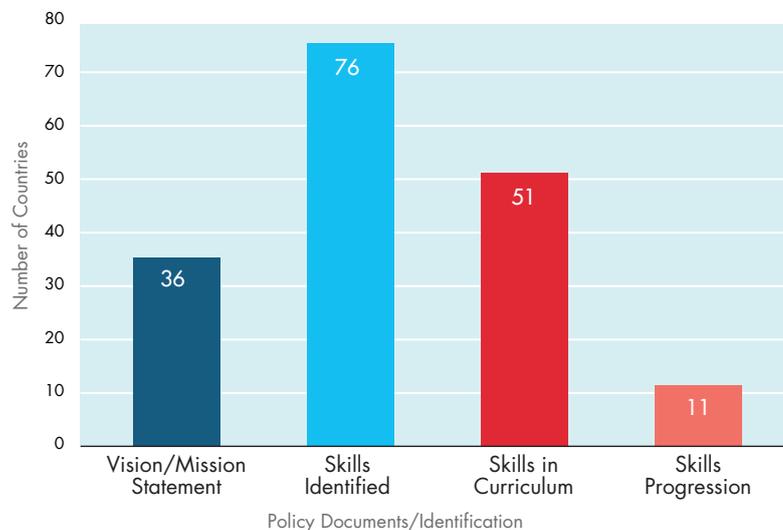
Research by the Brookings Institution (Care et al, 2016) has shown that the kinds of wider skills or dispositions we have been exploring are beginning to filter their way into schools across the world (see Figure 5). The data show that 51 countries have specifically identified skills across the subjects of the curriculum, and 11 have not just identified wider or broader skills but developed skills progression frameworks for them. This is a much better indication of a real commitment to action, rather than, as can all too easily happen when waving the twenty-first century skills ‘banner’, a vaguer allegiance to a ‘movement’.

The National Research Council of the USA (Pellegrino and Hilton, 2012) has contributed thoughtfully to these issues with a definition of twenty-first century skills.

We view 21st century skills as knowledge that can be transferred or applied in new situations. This transferable knowledge includes both content knowledge in a domain and also procedural knowledge of how, why and when to apply this knowledge to answer questions and solve problems.

While the problem of loose wording remains with the continuing use of the twenty-first century tag, the focus on transferring different kinds of knowledge being the distinguishing element is interesting. Using something you have learned in another context to help you answer questions and solve problems is certainly useful, as in the emphasis on learning transfer more generally. However, the use being suggested (answering and solving) is strangely limited. Why not challenging, critiquing or questioning, for example?

Figure 5. The incidence of broader skills in national curricula (Care et al, 2016)



Two other helpful perspectives in this discussion come from the thinking being generated by the Learning Power Approach (Claxton, 2018), in the UK, and New Pedagogies for Deeper Learning, (Fullan and Langworthy, 2014), developed in Canada.

Guy Claxton explores in detail the ways in which schools can develop learners who are curious, proactive, intrinsically motivated, independent-minded, thoughtful, open-minded, adventurous, robust, resilient, critical and sceptical. Michael Fullan’s concept is of deep learning, talking of developing

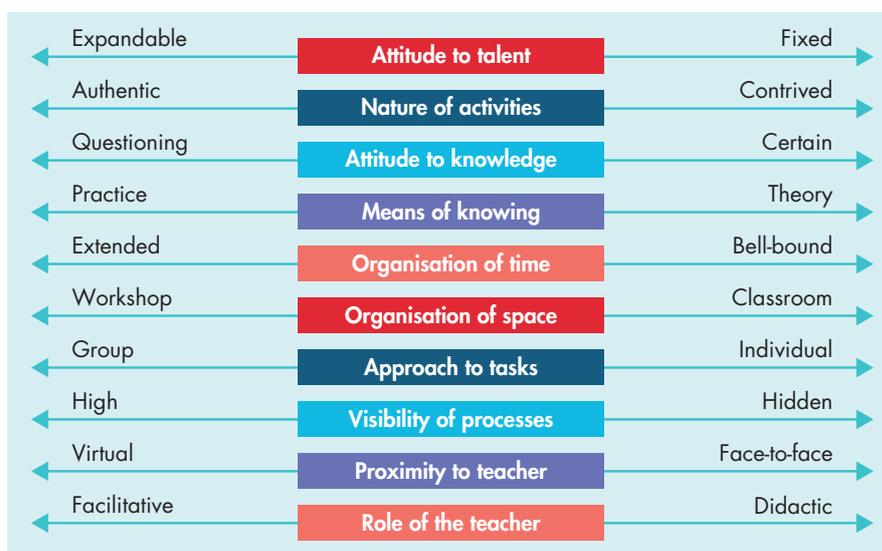
the learning, creating and ‘doing’ dispositions that young people need to thrive now and in their futures. Premised on the unique powers of human inquiry, creativity, and purpose, new pedagogies are unleashing students’ and teachers’ energy and excitement in new learning partnerships that find, activate and cultivate the deep learning potential in all of us.

Both of these approaches are now being used across the world, demonstrating

another aspect of contemporary curriculum development that it is no longer a national phenomenon but much more of a global market for good ideas.

In thinking about the wider system it may be helpful to talk of ‘expansive education’, (Lucas, Claxton and Spencer, 2013). This concept is framed to widen our notions of what schools are about, in four dimensions. First there is an explicit focus on developing both learning dispositions **and** knowledge. Second, it reframes intelligence to encompass evidence on the importance of encouraging the kinds of mindsets that enable learners to deal with complexity and difficulty. Third, it seeks to expand horizons beyond the school gates to engage with the outside world and local community, and actively to welcome engagement with experts other than teachers, important as they are. Finally, expansive education rethinks the role of teacher to become at least as much about learning as about teaching, modelling the kinds of dispositions in their own behaviours that they seek to cultivate in young people, being action researchers in name or at least in spirit in all that they do.

Figure 6. Pedagogies for Expansive Education (Lucas, Claxton and Spencer, 2013)



Expansive education, learning power and new pedagogies for deeper learning all shift the debate away from the **what** to the **how** of learning, focusing at least as much attention on pedagogy as on skills or capabilities or dispositions. Figure 6 shows ten expansive choices that teachers need to make whenever they are designing learning experiences. In most cases neither end of each of the continua is ‘right’ or ‘wrong’, although when it comes to thinking about talent or the visibility of learning processes, research would suggest that we might want to be on the left-hand side of the figure.

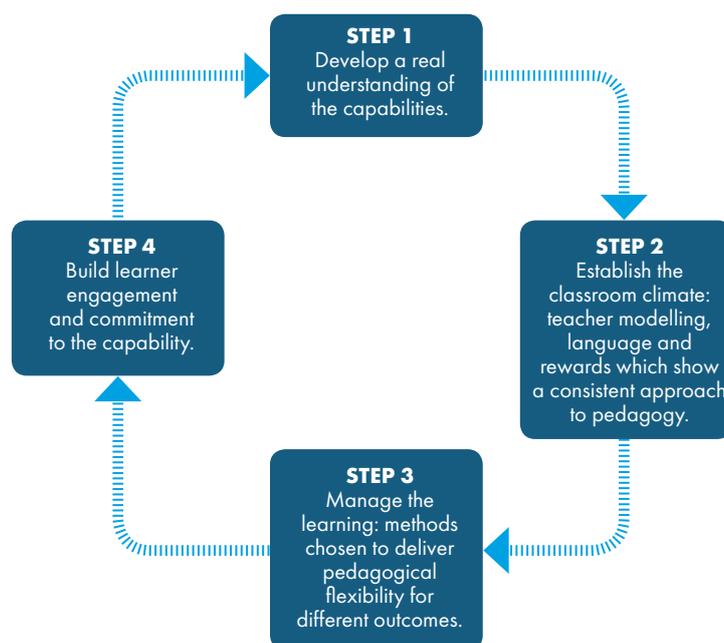
The words in the centre of each of the ten lines invite teachers to reflect on some choices they will need to make as they design any learning experience. It is important not to see these as binary choices. So, for example, where it has become fashionable in some circles to extol or deride didactic or facilitative approaches to instruction, this is an unhelpful position. For the answer would depend on what outcomes were desired. Providing a clear framework of knowledge from which to

work, or an expert demonstration of a new process, might suggest a more didactic approach, while setting up an extended investigation might call for an approach that was more facilitative.

Schools which are effective in explicitly embedding the kinds of wider skills or dispositions we have been considering tend to go through a four-step process (see Figure 7).

Step 1 requires real, detailed and specific understanding of the desired disposition (as opposed to the generalised twenty-first century approach). Step 2 is largely cultural, recognising that if we want to cultivate resilient, creative, collaborative young people then the ecosystem of school needs to be conducive, with teachers modelling the dispositions they want to see in their students. Stage 3 demands skilful instructional design, selecting teaching and learning methods that are likely both to strengthen the disposition and work well in the context of the specific disciplinary domain. So, for example, a science teacher wanting to help students to develop their resilience and creativity

Figure 7. A four step process for embedding capabilities (Lucas and Spencer, 2018)



might organise a session that required students to select their own equipment for an experiment and learn some techniques for generating ideas as part of the inquiry process. Step 4 is a reminder that student agency and motivation is an essential goal, something that can be built both within the formal curriculum and in more expansive extra-curricular or off-site opportunities.

Alongside these four steps are three key principles.

1. We need to value knowledge and dispositions equally, by stressing their importance at every stage of the learning, assessment and reporting processes. If this does not happen then dispositions will be largely invisible in schools, which are still dominated by subject timetables. Thus a teacher might say: ‘Today we are going to explore the history of the early settlers in Australia and at the same time we will be developing our ability to think critically, looking at sources to understand more about their perspectives and potential biases.’
2. It will be important to select and practise thinking routines relevant to any learning disposition, recognising dispositions can be less obvious to grasp than the knowledge that makes up the subjects of the curriculum. Thinking routines are to dispositions as grammar is to language, or number to numeracy: the building blocks of ways of being and doing. So ‘think–pair–share’ is a useful way of developing a collaborative approach to developing ideas or exploring a point of view.
3. We must clearly specify learning progressions (Masters and Forster, 1997) for the kinds of dispositions that increasingly are agreed to be

the hallmark of powerful learners. Such progressions would detail, potentially over two-year periods, clear descriptions of the relevant capability and its associated knowledge and skills, as well as empirically derived descriptions of the behaviours we might expect to see as learners progress from simple to complex, novice to expert.

Creating an expansive education system in general, and schools in particular – which focus on the development of expert learners, young men and women who are knowledgeable, skilful **and** capable **and** who routinely choose to deploy their capabilities in many different contexts – is surely worth focusing on.

The kinds of questions we may wish to explore involve the intersection of dispositions and subject and real-world domains.

- How best can critical thinking be embedded in science?
- Which creative techniques work well for solving new problems in maths?
- Which aspects of metacognition might best be introduced, in which subject and at what stage of a student’s development?
- How can we best teach students to apply problem solving, learned in class, to lives outside school?
- How can we help learners develop ways of motivating themselves, to give their best shot to areas of learning at school or beyond that currently they do not find easy or enjoyable?
- In terms of self-efficacy and the development of a growth mindset, how best can a whole school focus on helping students to learn how to believe

‘think-pair-share’ is a useful way of developing a collaborative approach to developing ideas or exploring a point of view

in themselves and see mistakes as their friends, and how, concurrently, can we help parents to learn ways of praising their children for the specific aspects of the effort they show when undertaking learning?

- What would it look like if every classroom and every home was a place where learners have multiple strategies for persevering when they get stuck?

We have some of the answers to these questions but not yet a systematic consensus or widely agreed strategies for putting them into practice.

As we move through 2019 we need a precision of thinking about language and instruction, as well as a willingness to identify areas of further enquiry, rather than largely technology-led discussions about twenty-first century skills.

Endnotes

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Bill is a prolific writer, and has authored more than eighty books and many research reports. His latest books, written with Ellen Spencer, are *Developing Tenacity: Creating Learners Who Persevere in the Face of Difficulty* and *Teaching Creative Thinking: Developing Learners Who Have Fresh Ideas and Think Critically*. His acclaimed critique in 2015 of the education system in England, *Educating Ruby: What Our Children Really Need to Learn*, written with Guy Claxton, asks challenging questions about the future direction of schools. In 2018 his report for the Mitchell Institute, *Capable Country: Cultivating Capabilities in Australian Education*, suggested a route map for Australia for implementing the Melbourne Declaration in all schools.

About the Paper

As the twenty-first century runs its course it is, argues Professor Lucas, increasingly unhelpful to talk of twenty-first century skills as if we either do not yet know what they are or somehow assume that they will remain the same for the next eight decades. The conversation, Lucas suggests, needs to shift away from a rallying cry towards the detailed pedagogical design work needed by teachers to embed dispositions for learning in every aspect of the formal and informal life of school, so that they will become habitual for all students, available to them for a lifetime of learning.

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