

FUTURE-PROOFING STUDENTS

What they need to know and how educators can assess and credential them



CREATIVITY & IMAGINATION

Melbourne Graduate School of Education



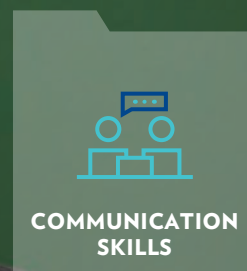
COLLABORATION & TEAMWORK



CRITICAL THINKING



ECONOMIC LITERACY



COMMUNICATION SKILLS

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Executive summary

Future-proofing our students so that they will have the skills to negotiate and thrive in increasingly complex global workplaces is a challenge for all educators. These crucial skills are often referred to as 21st-century skills, general capabilities, graduate attributes or transversal skills.

For students to thrive they need to become expert learners. They need to acquire a body of knowledge, skills, attitudes and values that enable them to adapt and contribute in an ever-changing environment.

The skills, or capabilities for learning, include the basics of literacy, numeracy and the use of information and communication technology. More than this, they also encompass broader social skills of communication, collaboration and ethical behaviour and the ability to perform in an intercultural environment. Personal skills, such as persistence and the capacity to use feedback and analytical skills, such as computational thinking, creativity and criticality, are also paramount. Increasingly, the need for entrepreneurial and enterprise skills reflects the new ways of living, learning and working in the digital era.

Most education institutions and schools in particular, regard these skills or capabilities as being at the heart of their teaching. In fact, the capabilities for learning outcomes are now included in formal curriculum statements, both nationally and internationally. Debates ensue, however, about whether or not it is feasible to teach and assess these skills formally. What is clear is that these skills cannot be learned if learning is experienced only through carefully directed, broadcast-style instruction, targeting mastery of set texts and assessed using well-rehearsed written examinations that rely on individual, intellectually focused effort.

For learners to develop these skills or capabilities, the organisation of learning must provide students with the opportunities to truly exercise their capacities.

Authentic, challenging learning tasks are required, preferably ones that are relevant to and engaging for the learner and should be incorporated into teaching in any and all domains or fields of study, be these history, mathematics, plumbing, engineering, music or sport.

In order to upskill learners and to future-proof them, we need to assess these capabilities, offer feedback on how they are performing and report their progress to external stakeholders, such as parents and potential employers. The capabilities can be assessed directly and recognised alongside the more traditional assessments dealing with the mastery of content. There are professional challenges confronting those who do assess and recognise these capabilities, but practical techniques, perspectives and tools have been developed, as the case studies in this paper demonstrate.

Some organisations are already engaged in innovative teaching and assessment, particularly in secondary and post-secondary education and in the transition from school to work. But there are lessons for assessment and reporting that are applicable to any level of education, from early childhood to universities and workplaces, so that learners can develop the essential, transferable skills needed for lifelong learning.

If the goal is to ensure that learners can master skills as part of their day-to-day educational endeavours, it is simply not effective to play around the edges of current practice, with minor adjustments to teaching and assessment. What we need is deeper, more systematic change, starting with altering what and how we assess and we need it sooner rather than later.

Key messages



Future-proofing our students means ensuring that they learn a wide range of skills, or capabilities, that will allow them to thrive in increasingly complex global workplaces.



The development of deep learning, or deep expertise in any domain or discipline and the development of these learning capabilities or skills occur simultaneously. One is not attained without the other.



Methods and technologies already exist to assess reliably and to recognise the level of attainment of each learner on these capabilities.



The purpose of encouraging and supporting the attainment of such capabilities for all students, is so that they have the knowledge, knowhow, attitudes and values they will need to thrive as lifelong learners in schools, colleges and workplaces. These capabilities constitute the necessary building blocks we need to create a society of lifelong learners.



A recent review of school reporting to parents in Australia provided no evidence that schools are requiring, assessing and reporting on the learning of these capabilities, even though some of the capabilities have been part of the Australian Curriculum since 2012.



The use of a developmental learner profile based on quality assessments would enable students to better manage their own learning, monitor their own progress and recognise the learning skills they already have or need to attain. It would allow other stakeholders to better understand an individual's strengths.



These interrelated skills, or capabilities, include the basics of literacy, numeracy and use of ICT, analytical skills such as problem-solving, creativity and criticality, application skills such as persistence and using feedback, as well as social skills for effective communication, collaboration, intercultural capability, ethical behaviour, citizenship and community service.



Sustained effort and investment are required to change the organisation of learning so that learners can develop these essential skills or capabilities. Learners need to practise performing authentic, challenging and engaging tasks that require these skills and which are incorporated into the teaching of more traditional subjects.



Robust assessments need not skew teaching and learning efforts, as standardised tests and written examinations often do. Quite the contrary. If it is done properly assessment and recognition can be a valuable and positive lever for change.

Recommendations



Teaching, assessing and recognising learning capabilities make the goalposts for learning visible. Providing a common, trusted and fair approach to demonstrating skills or capabilities will not disadvantage students and may well do the opposite.

Future-proofing our students means ensuring that they learn a wide range of skills, or capabilities, that will allow them to thrive in increasingly complex global workplaces.

Educators need support as they move to incorporate the use of transparent, trusted, comparable, moderated, developmental, performance-based assessments of students' levels of attainment in learning capabilities, or skills, into their normal assessment and reporting practices. The following recommendations would enable the transition to a new system of assessment as outlined in this paper.



01

A Standards Framework

We need to develop a standards framework to assist teachers with making comparable assessments of learners' levels of attainment in capabilities for learning.

02

A Reporting Framework

We need to design a flexible reporting framework to assist educators to credential attainment and to provide common currency for reporting by Australian educators.

03

Moderation Support

We need to provide moderation support to at least the same level provided for more traditional content areas in the curriculum.



01



Introduction

Future-proofing our students so that they will have the skills to negotiate and thrive in increasingly complex global workplaces is a challenge for all educators. These crucial capabilities are often referred to as 21st-century skills, general capabilities, graduate attributes, or transversal skills.

For students to thrive they need to become expert learners. They need to acquire a body of knowledge, skills, attitudes and values that enable them to adapt and contribute in an ever-changing environment.

These capabilities can be learned, taught and assessed. Becoming an expert learner allows a person to master what they need to know in any circumstance.

Some of the capabilities required to be a good learner are now included in various Australian and international curriculum statements. Education institutions – schools in particular – typically regard development of such capabilities as being at the heart of their teaching. However, consensus remains elusive about their definition and their significance. Debates ensue about whether or not it is feasible to *formally* teach these capabilities, as well as how, or indeed whether or not, these should be assessed and then reported on to students, parents and other stakeholders.

In this paper, we present evidence and discussion in support of an argument that capabilities for learning, or learning capabilities (see Figure 1), *should be* taught, assessed and recognised. We also examine how to assess, report and credential the degree to which young people have developed these capabilities.

The arguments presented here are likely to be of interest to education leaders and teachers who are grappling with how to prepare students to thrive in the challenging learning environments of the contemporary school, college, university or workplace. In the digital era, every citizen needs the capabilities to be an effective lifelong learner and to thrive in an environment in which change is a key constant. A thriving society depends on each of us having the skills, attitude, values and knowledge to adapt and learn, leaving none behind.

Learning capabilities are a class of learning outcomes that encompass particular knowledge, knowhow, attitudes, values and beliefs commonly referenced in contemporary curriculum documents and which complement discipline- or subject-based knowledge.

A range of alternative, overlapping and at times competing terms are used in the professional literature to refer to these capabilities, such as 21st-century skills, soft skills, enterprise skills, employability skills, transversal skills, general capabilities, complex competencies and graduate attributes.

The capabilities are broad, covering the basics of literacy and numeracy as well as the knowledge, skills, attitudes and beliefs associated with social knowhow, such as ICT use, communication, collaboration, intercultural capability, ethical capability, citizenship and community service. Skills of the mind are also included, like analytical, critical and creative thinking, as are new ways of working, such as entrepreneurialism, or enterprise skills.

Capabilities such as perseverance and ability to use feedback are likewise encompassed. The degree to which a learner attains such capabilities determines their overall learning expertise; upskilling learners in these capabilities is essential if we expect them to thrive as lifelong learners in work, family and community life.

Definition of learning capabilities

The capabilities are broad

Covering the basics of:



Literacy and numeracy



as well as the knowledge, skills, attitudes and beliefs associated with:



Social knowhow



Such as analytical, critical and creative thinking

as are new ways of working:



entrepreneurialism, or enterprise skills



perseverance and ability to use feedback.

Figure 1. Definition of learning capabilities.¹

Failure to recognise this point in subject- or discipline-based teaching leads to the creation of learners with excessive dependence on direct instruction, cramming, drilling and coaching and on assessment practices that test memorisation, essay writing, individual mastery of set content and solving of problems with formulaic solutions.

The argument in broad

Most capabilities for learning can be taught and assessed if conceptualised as ordered sequences of increasingly sophisticated, teachable behaviours. Assessment practices are now available, or emerging, to support schools to make valid and reliable judgments about learners' levels of attainment in these capabilities. New approaches to recognition, such as micro-credentialing and construction of learner profiles, have utility for learners, as they develop their own capabilities and for other stakeholders interested in selection and recruitment for pathways beyond schooling. It is also clear that the demands of such assessment and recognition in any learning environment will require substantial effort by and for schools, including the development of technology and other supports that are not typically available at present.

Core to the argument also is that this effort is worth the bother. Learning capabilities cannot be taught independently of discipline or other substantive content domains of learning. Developing proficiency in learning capabilities and mastery of *depth* of learning in disciplines or other content knowledge are interdependent and necessary correlatives; one is not obtained without the other.

Failure to recognise this point in subject- or discipline-based teaching leads to the creation of learners with excessive dependence on direct instruction, cramming, drilling and coaching and on assessment practices that test memorisation, essay writing, individual mastery of set content and solving of problems with formulaic solutions.

A student can get an excellent mark mastering 'book learning' but may not have the learning skills to develop depth in a domain, or the personal and social skills that they will need to manage learning beyond school, where they may not be supported by professional instruction and guidance, or be assessed in predictable ways.

Another key aspect of the argument is that proficiency in many and perhaps most, learning capabilities included in school curricula can be transferred from one domain, discipline or context to another.

That is, if one is a good communicator, is literate and displays intercultural skills in one context, one is likely to be able to apply these in other contexts. The important point for educators is that levels of attainment on these transferable capabilities can be estimated independent of the specific domain, discipline or context in which they are taught and assessed.

Fundamentally, unless learners' levels of attainment on these capabilities are assessed and formally recognised in assessment and certification systems, they will not be valued or intentionally taught. Reform of assessment and certification systems, particularly at the senior secondary level, is thus necessary.

Professional concerns about this argument are understandable and this paper addresses many of these concerns. Will shifting focus from knowledge to knowhow further marginalise disadvantaged learners in schools, or will it be their salvation? Will the curriculum get overrun by yet more assessment that will heighten anxiety among students and add stress on teachers? What are the implications for teachers and for schools? Do they possess the knowhow and the resources needed to manage this shift?

Evidence base

The argument in this paper is presented as a set of working conclusions drawn from observations of and discussions about, the innovative work of hundreds of professionals, working on behalf of thousands of students. While the evidence base for the argument is just starting to develop, this is to be expected whenever and wherever educational innovation is required.

Evidence is drawn from work undertaken by the University of Melbourne, through its Assessment Research Centre (ARC), which has, in partnership with many innovating educational organisations, investigated and developed methods and theory for assessing and credentialing the development of capabilities for learning.

The ARC began work in this area a decade or so ago, with initial work focusing on how to scale assessment and teaching of 21st-century skills. The early research focused on how to assess collaborative problem-solving using digital tasks², how to assess literacy and numeracy skills in classrooms³ and how to assess the range of foundational learning skills that students with additional needs require to participate fully in typical classrooms⁴. The ARC developed a distinctive approach to assessment, best described as judgment-based, developmental, competency-oriented and criterion or standards referenced. Its methods of assessment have been trialled extensively, delivering high levels of reliability and validity in the assessment of complex learning outcomes⁵.

More recently, the ARC has extended this research⁶ with a range of schools and other organisations, to consider the opportunities, practicalities and implications of undertaking scalable, valid, reliable and auditable methods of credentialing learner attainment of complex capabilities. These collaborations have enabled refinement of assessment and reporting techniques and methods, exploration of associated technical and educational issues and clarification of broad assumptions about learning and teaching.

Brief descriptions of some these collaborations, which have been drawn upon to illustrate and support the points made in this paper, are summarised in Table 1. More detailed case-study profiles of each collaboration are provided in Appendix 1.

In spite of the diverse nature of the organisations described in Table 1, each one is engaged in a long-term strategy for educational improvement focused on generic, yet complex, learning capabilities. Each has a broad educational goal that guides their strategy, and each regards assessment and, where applicable, credentialing of the capabilities as central to their goal. Each understands that improving learning of these capabilities necessitates changes to assessment, reporting, pedagogy and the organisation of learning. Each has adopted new methods of assessment and recognition of learning, such as those described in this paper. For each organisation, their work is still in progress.

This paper describes the tools, techniques and ways of thinking about assessment and recognition of learning capabilities', illustrates some of the practicalities and comments on some of the implications for policy and practice that are emerging.

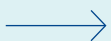


Table 1: Innovating organisations adopting competency-based, developmental, standards-referenced assessment and recognition of learning capabilities

Big Picture Education Australia (BPEA)

BPEA is a national schooling organisation that is devising a new non-ATAR credentialing system for its graduates based on its innovative 'Design for Learning', which is being implemented in a network of secondary schools around Australia. Learning is personalised around each student's passions and interests linked to five mandated learning goals and assessment focuses on learning and attainment of these complex competencies both in school and in the community. The design is now accepted and trusted by students, parents, universities and training providers and employers.

Chartered Accountants Australia and New Zealand (CA ANZ)

CA ANZ are redesigning the assessment and certification system for practising accountants. They regard the future development of the profession as dependent on competencies not recognised in current higher education credentials in accountancy.

Latrobe Valley Authority (LVA)

LVA is establishing its own micro-credentials in enterprise skills for workers and graduates from any level of education. These skills are not typically recognised in mainstream credentials but are needed by people working in the emergent economy that will transform the economic and social landscape of the Latrobe Valley, in Victoria, Australia.

Ministry of Education (MoE), Kingdom of Saudi Arabia

The MoE is seeking to build assessment capacity in their staff to modernise their school systems and introduce complex general capabilities and developmental assessment in schools.

SWANS

SWANS are a range of assessments for students with additional needs, developed by the ARC in collaboration with the Department of Education and Training Victoria. The assessments are now being used in most state and territory education systems in Australia. These support assessment of competence in literacy, numeracy, communication, social processes, learning skills, emotional understanding, digital literacy, thinking skills and movement. These are complex capabilities that students require to tackle the foundation levels of curriculum on offer in schools.

University of Melbourne Network of Schools (UMNOS)

A number of innovative primary and secondary schools in UMNOS are developing assessment and micro-credentialing of complex and general learning capabilities. Featured here is the work of Beenleigh State High School in Queensland.

Victorian Aspiring Principal Assessment (VAPA)

The ARC is working with Bastow Institute to develop and implement a system-wide process of assessing the readiness of aspiring principals for principalship, providing them with a developmentally based assessment of their readiness.

02

What are capabilities for learning?

The notion that complex capabilities for learning should be adopted as a formal part of the school curriculum for all students was first expressed in Australia and internationally, early this century.

These outcomes emerged in response to a range of contemporary and forecasted pressures that have sparked reconsideration of what students should know and be able to do as a result of their schooling. Some of these pressures include the explosive growth in the knowledge base of disciplines and professions, the increasingly competitive global economy, the fracturing of family and community structures, the increasing levels of structural economic inequality and the emerging threat of climate change.⁸

Capabilities for learning as curriculum components

The purpose of encouraging and supporting the attainment of complex capabilities in the curriculum is so that students can develop the knowledge, knowhow and capacity to keep learning in order to meet real-world challenges in a range of situations. This means, for instance, that accounting students need to learn the principles of accounting as well as the ability to perform as accountants who tackle community or business problems using the knowledge and knowhow of their discipline.

This involves communicating and working with others, managing intercultural differences and ethical challenges, appreciating perspectives other than their own and exercising critical thinking and imagination to generate novel solutions to new problems. They need also to learn how to direct and manage their own learning in the field and to not rely solely on mastery of material presented in lessons or texts. All of these add a new dimension to the kinds of teaching and assessment typical in schools and universities.

In response, curriculum statements have been expanded, with more generic learning outcomes supplementing more traditional, discipline-based or subject-specific outcomes. In the Australian Curriculum, for example, general capabilities have been included as a dimension of the curriculum. These are defined as the 'knowledge, skills, behaviours and dispositions that, together with curriculum content in each learning area and the cross-curriculum priorities will assist students to live and work successfully in the 21st-century'. Figure 2 shows the current representation of the general capabilities in the Australian Curriculum. Representations similar to this are common in countries around the world.

The inclusion of capabilities for learning, such as the general capabilities, as officially sanctioned components of curriculum has not gone uncriticised. Some critics are uncomfortable with the designation of these capabilities as 21st-century skills, as if they are new to the human condition, when, in fact, celebration of qualities such as critical thinking and collaboration have been evident for millennia; they are only 'new' as targets of core curriculum for all.¹¹

Also criticised is the lack of precision around common usage in the profession, which is replete with overlapping and competing terms. A myriad of classifications and lists of the various capabilities or their component parts exist, each preferred by some individuals and groups over others and each with its own set of definitions. This creates challenges for the profession in arriving at a precise curriculum understanding of complex capabilities. Other criticisms relate to doubts as to whether or not such capabilities can be taught, as distinct from being learned.¹²

This involves communicating and working with others, managing intercultural differences and ethical challenges, appreciating perspectives other than their own and exercising critical thinking and imagination to generate novel solutions to new problems. They need also to learn how to direct and manage their own learning in the field and to not rely solely on mastery of material presented in lessons or texts.

Complexity

As curriculum components, the capabilities are usually represented as comprising a constellation of skills (of different kinds), knowledge (cognitive and meta-cognitive), attitudes, values and beliefs.¹³ The component parts are usually teased out in curriculum statements and are often accompanied by descriptions of the pattern of behaviours that teachers can expect to see as students develop their competence. For example, the capability of 'collaborative problem-solving' has been defined as having five distinct strands, including participation, knowledge building, perspective taking, social regulation and task regulation.¹⁴

This definition is represented in progressions (see Appendix 2 for samples) of competency over six levels of attainment, highlighting the changes in behaviour manifest in learners as they learn how to collaborate to solve problems.

Similarly, 'intercultural understanding' is defined as a general capability in the Australian Curriculum. It has six levels with level descriptions for nine strands or sub-elements (investigate culture and cultural identity; explore and compare cultural knowledge, beliefs and practices; develop respect for cultural diversity; communicate across cultures; consider and develop multiple perspectives; empathise with others; reflect on intercultural experiences; challenge stereotypes and prejudices; mediate cultural difference).¹⁵

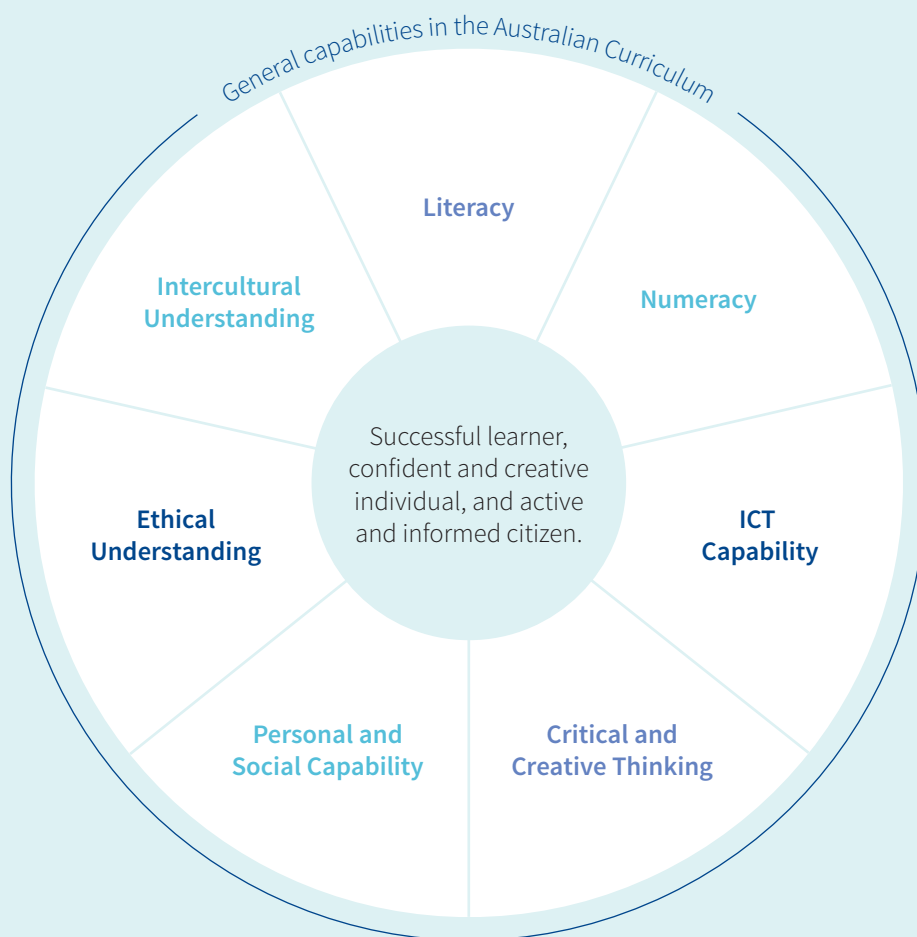
While the component parts of these complex capabilities are routinely teased out in curriculum statements, these parts manifest as a whole in reality. Expertise, or competence, is not as divisible as it is represented on paper. Ticking off a checklist of component parts is no guarantee that competence has been attained. Erpenbeck and Heyse highlighted this point when they theorised the nature of these capabilities, suggesting that they are 'grounded in knowledge, are constituted through values, are dispositioned through skills, are consolidated through experiences, and are realised on basis of will.'¹⁶

Interrelatedness

Capabilities for learning are not discrete curriculum objects. In practice, definitions overlap and specific components manifest in multiple capabilities. Communication, as a capability for learning, for instance, requires application of other capabilities, such as literacy, ICT skills (if communicating online), intercultural capability and ethical capability. A brief examination of learning continua for the Australian Curriculum general capabilities reveals that a sub-element dealing with capacity to recognise and handle diverse perspectives is key to three of the general capabilities (ethical understanding, intercultural understanding and personal and social capability).¹⁷

Development of the various strands, sub-elements and themes, as components of complex capabilities, is not separable in the same way that learning Chemistry as a subject, for instance, is separable from learning Geography.

Figure 2. General capabilities in the Australian Curriculum.¹⁰



Excerpt from the **Mparntwe Education Declaration 2019**:

... every student must develop literacy and numeracy skills and develop broad and deep knowledge across a range of curriculum areas ... Education plays a vital role in developing intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing ... (students) need flexibility, creativity and the ability and drive to learn.

The simultaneous development of capabilities for learning and content

Deep learning is required to master any discipline or profession and expertise in any field cannot develop from purely cognitive activity obtained through diligent application to texts and tests. The development of capabilities for learning and deep learning in traditional forms of knowledge is intertwined.

In History, for instance, deep mastery requires both the memorisation of historical facts and the development of complex skills such as chronological thinking, critical thinking, examining and interpreting evidence and engaging with multiple perspectives.¹⁸

Without a focus on mastery of generic capabilities, assessment and teaching practices tend to privilege memorisation, essay writing, individual mastery of set content and solving of problems with formulaic solutions. The risk is that schools create students dependent on direct instruction, cramming, drilling and coaching, reliant on expert instruction by teachers who are expected to guide learners through a carefully prescribed body of knowledge, assessed in predictable ways.

These students can get an excellent mark mastering 'book learning', but they may not possess the learning skills to develop depth of understanding in a domain, or the personal and social skills and the habits of mind for self-directed, lifelong learning.

Transferability of general capabilities

It is tempting to argue that if people cannot learn to be critical thinkers until they have learned something to think about, for example, then there is no point assessing the capability separate from the content knowledge. This apprehension remains in education.

However, intrinsic to the idea that learning capabilities should be taught and assessed is the premise that while capabilities are *learned* in context, they are generic and are *transferable* by a learner from one context to another. For instance, if a person demonstrates communication skills in one field, then they should in theory be able to display these skills in another. It only makes sense to assess and credential the degree to which a person possesses a capability, in a general sense, if transferability is possible. Otherwise, capabilities can be regarded only as creatures of context, rather than having broad application.

Research literature on this topic is underdeveloped, however, as it is difficult to generate an empirical test of learning capabilities transfer in the real world. One strand of argument in the literature dismisses the idea of transferability, or contends that transferability is limited, as the *kind* of communication needed, for example, will differ from context to context. Perkins and Salomon note in their review of transfer in education that the capacity to take a set of content or skills from one context to another 'comes hard'.¹⁹ A study by the National Research Council on the transfer of 21st-century skills, such as collaboration, endorsed this view, concluding that the skills needed to be developed within each context.²⁰ Further, a significant body of literature exists on the difficulties associated with transfer of various skills, such as problem-solving, from one context to another.²¹

Other education experts see transferability as the premise, a view that is inherent in contemporary curriculum statements. Others suggest that development of complex meta-cognitive skills provide the *best* measure of learning transfer and that these skills may indeed provide the *means* of transfer.²²

Thus, in the case of communication, a person transferring from one domain to another may not yet have the vocabulary or understanding of a specific concept to immediately exhibit the full range of communication skills. However, their communicative competence is latent; it can be used in the service of learning in the new domain and is increasingly deployed as their domain knowledge develops. This latter view aligns with the views of employers, for instance, whose selection processes assume that if a candidate has been persistent, diligent, communicative and collaborative in previous employment, then they can be expected to transfer these to a new role.

Implicit in the work of the organisations featured in this paper is the view that capabilities are valuable *because* they are transferable; they provide the means for continuous learning and will serve people well across diverse roles over time. One implication of this view and one which informs the assessment and credentialing work reported in this paper, is that assessment and credentialing processes must focus on understanding how to develop and assess *transferable* skills, while at the same time recognising that all learning requires context.

This leads ultimately to an argument for ensuring that teaching and assessment practices focused on capabilities for learning are distributed across an educational organisation and reinforced across contexts. Development of these capabilities should not be left to just one teacher, located in one subject and/or limited to one project.

The importance of performance

The attainment of complex capabilities is designed to ensure that students develop the knowledge and knowhow to meet real-world challenges. This adds a new dimension to 'normal' teaching and assessment in schools and universities, one that requires learners to demonstrate knowhow as well as knowledge. Didactic pedagogies and cognitively oriented assessment methods are insufficient, as these do not provide opportunities for students to demonstrate their ability to perform in multifaceted, demanding situations more akin to real life.

Effective teaching and assessment of capabilities require students to practice and develop competence in response to challenge and to demonstrate it through performance. Performance in this sense refers to the situation in which students have to say, do, make or write something to generate evidence that they have attained a particular capability or a set of capabilities. For instance, if learners are being assessed on their capacity to work in an intercultural context, they should be required to perform tasks in a range of intercultural situations. Writing an essay about what they might do in hypothetical circumstances will not do.

The intricacies of how to provide meaningful and reliable assessments of complex performance is not new to teachers and are well rehearsed in the arts, in sport and in other traditionally performance-based areas of the curriculum. Now, the aspiration to integrate learning of capabilities with other disciplines has extended the ask of assessing performance to all teachers.

A particular problem for the assessment of individual competence occurs when performance has a social component. The ability to collaborate, for example, is developed and demonstrated only in relation to a practical requirement for collaboration within a particular context, such as in the classroom or at work. Similarly, ethical understanding only manifests in contexts of exploring the processes of ethical decision making and/or ethical issues in society that are meaningful and relatable. The skill of considering and negotiating multiple perspectives can be performed only when different points of view are at play.

Teachers understand well the difficulties associated with the assessment of performance, especially when it requires group or team efforts. Group work or project work is popular, but one student may dominate a group and it may be unclear who in the group contributed which aspect of the work. Sometimes the performance required is abstract or theoretical, without much meaning for assessing competence (e.g. 'imagine you are on a desert island ... what would you do if ...'). Cultural norms around group dynamics may be another factor.

After reviewing a decade of large-scale, psychometrically based work on the scalability of assessing collaborative problem-solving, the prestigious US group National Assessment of Educational Progress (NAEP) conceded that it is not yet possible to confidently measure the collaborative-problem-solving ability of students. Measurement error is associated with inability to disentangle an individual's capability from the action of others in the group.²³ Psychometric solutions to this problem continue to be pursued.^{24,25}

In the meantime, innovators are forging ahead with practical, scalable approaches to assessment – examples to follow – that rely on authentic performances by students. They are developing practical solutions to the challenges of assessing performance, to ensure that assessment and credentialing of capabilities are trusted and scalable. Some leading-edge work focuses on opportunities for using digital data generated by students using learning management systems, to produce digital learning artefacts with attendant intelligent analytics support.²⁶ Non-technical solutions are also promising, such as using a broad evidence base from a range of learning contexts to ensure that high-quality, on-balance judgments are made regarding the development of capabilities. For example, Bastow Institute's work on assessing the skills of aspiring principals, LVA's work on assessing enterprise skills and Beenleigh's initiatives to assess the work readiness of its graduates adopt this approach.

Disposition towards action

One response by educational leaders to uncertainties about how to teach and assess capabilities is to await developments. A recent review of school reporting to parents in Australia provided no evidence that schools are assessing and reporting on complex capabilities learning, intentionally and separately, despite the fact that these capabilities have been specified in the Australian Curriculum since 2012.²⁷ Criticisms of senior secondary school certificates and the ATAR in Australia point to their focus on cognitive outcomes, missing explicit representation of the complex learning

capabilities that are thought to predict success in further study or work.²⁸

Another response is to take practical, exploratory steps towards improving student outcomes. The organisations featured in this paper have adopted this course of action, seeking to define, teach, assess, report on and/or credential one or more capabilities, examples of which are listed in Table 2. More precise definitions for some of these capabilities are included in Appendix 1 as part of the case-study profiles.

In each case, the respective organisation is acting on the belief that complex capabilities are important; that every learner should develop these capabilities if they are to thrive in life; that it is possible, even essential, to teach these capabilities; that it is feasible to reliably assess and credential capabilities to the satisfaction of exacting external stakeholders, if these stakeholders are engaged at the right time; that most stakeholders accept and value that complex capabilities are transferable; that classroom and school-based assessments of capabilities can be valid, reliable and scalable, but only if non-didactic approaches to teaching and assessment are used with the appropriate resources and professional learning support.

Criticisms of senior secondary school certificates and the ATAR in Australia point to their focus on cognitive outcomes, missing explicit representation of the complex learning capabilities that are thought to predict success in further study or work.²⁸

Examples of valued complex capabilities by organisation

Project	Transferable complex capabilities of interest	
SWANs	<ul style="list-style-type: none"> » Literacy » Numeracy » Communication » Social processes » Learning skills 	<ul style="list-style-type: none"> » Emotional understanding » Digital literacy » Thinking skills » Movement
Big Picture Education Australia	<ul style="list-style-type: none"> » Quantitative reasoning » Social reasoning » Empirical reasoning 	<ul style="list-style-type: none"> » Communication » Personal qualities » Knowing how to learn
Beenleigh State High School	<p>Employability skills:</p> <ul style="list-style-type: none"> » Initiative and creativity » Problem-solving 	<ul style="list-style-type: none"> » Collaboration and teamwork » Self-management
Latrobe Valley Authority	<p>Enterprise skills:</p> <ul style="list-style-type: none"> » Enterprise communication » Enterprise collaboration 	<ul style="list-style-type: none"> » Enterprise problem-solving
ARCOTS	<ul style="list-style-type: none"> » Literacy » Reading 	<ul style="list-style-type: none"> » Numeracy
Other ARC projects for various clients	<ul style="list-style-type: none"> » Entrepreneurialism » Criticality 	<ul style="list-style-type: none"> » Student agency in learning

Table 2: Examples of valued complex capabilities by organisation

03



Aligning assessment and credentialing to the development of learning capabilities

While many school leaders accept that it is possible to teach, assess and recognise the degree to which students have attained capabilities for learning, a range of professional questions around *feasibility* remain. Examples of questions include:

- » How can complex capabilities be represented as learning outcomes in ways that support teachers to understand the trajectory of capability development?
- » To what degree is it feasible for schools to teach, assess and report on these capabilities? Do they have the necessary resources and organisation?
- » How can valid, reliable, comparable and scalable assessments be developed, given that these capabilities cannot be assessed adequately using traditional assessments, such as exams and tests?
- » How can the degree to which students have attained expertise in capabilities be recognised in ways that have utility and value for students and stakeholders, as well as sufficient flexibility to support different needs and requirements?

Poem: assessment of complex capabilities

Assessment is a process
 of systematically observing what people say, do, make or write
 during a relevant performance
 which requires proficiency in the competence of interest
 and using these observations as evidence
 to support an overall judgment
 about the position of the person
 on a standard scale of expertise from less expert to more
 indicating what they know and can do
 and what they need to learn next
 with a sufficient degree of precision
 to allow recognition and reporting of the level of attainment

Figure 3. Contemporary definition of ‘assessment’ applicable to the assessment of capabilities for learning.

The idea of assessment

In this paper, ‘assessment’ refers to the contemporary conception of judgment-based, developmental, competency-oriented, standards-referenced assessment²⁹, as articulated in Figure 3.

Assessment is conceptualised here as the process of gathering and synthesising diverse evidence, based on observations of what students say, do, make or write during a performance designed to elicit behaviours known to be associated with competence in the capability concerned and using these to make judgments of where on a continuum of competence the learner is placed, from low to high. If credentialing is required, judgments need to be reported so that these are referenced to external standards and trusted by stakeholders, with the basic qualities of validity, reliability, comparability, interpretability and utility applied.

Central to this approach is the need to include *performance-based assessments* as part of the assessment mix. Traditional assessments such as essays, multiple-choice responses, short answers and standardised tasks are insufficient. Students need to perform, create or produce in order to demonstrate their capabilities, often in a social environment and in response to particular challenges. Performance assessment typically requires use of combinations of evidence and assessment methods, including 360-degree profiling, judgments by peers, teachers, employers and/or other stakeholders, self-assessment, portfolio, presentations, actual performances and even robot-based performance assessments.

This approach to assessment demands significant effort and engagement by assessors. A clear continuum or scale of competence needs to underpin judgments about performance. It is insufficient and inappropriate to merely attach a number to a student, ‘grade off the curve’, compare students, or rank them without reference to criteria or standards that specify the degree to which learning meets requirements.

The rationale for this assessment approach is to position a learner in their journey as they develop competence within a domain, so it can be applied not just to assessment of capabilities for learning, but also to any complex learning outcome, including professional competence, or expertise in a domain or discipline.

In any particular instance of assessment, a range of considerations will shape the assessment design, such as timing (before, during or after the learning; episodic or continuous), purpose (formative or for reporting; high stakes or low stakes), the designated assessors (self, peers, teachers or others) and the degree to which technology will be used (from not at all to completely automated).

The key idea, however, remains: assessment is designed to judge and subsequently report on, with reasonable precision, what learners know and are able to do and what they still have to learn to further develop their capabilities.

What is recognition?

In this paper, 'recognition' refers to the process of using assessments to determine and certify the degree to which an individual has attained a particular level of competence, in a report or a credential. Reports and credentials are a form of currency for learning, thus carrying social value and utility. They are relied upon by parents and external stakeholders, including recruiters or assessors for work or further study opportunities. Hence, any report or credential should provide clarity about what individuals know and can do, preferably referenced to set criteria or standards that reflect common understanding of the capabilities required for a particular purpose, such as performing a job or successfully completing a course of study.

Common forms of recognition include school reports, certificates, degrees, licenses, diplomas, badges, or stamps. Recognition can be outward facing, for perusal by others and/or for internal use, such as to provide motivation for learners, acknowledging individual and group achievements and organisational evaluations. The form of recognition will vary depending on purpose and whether it is considered low stakes or high stakes. Similarly, the longevity of the recognition will vary, such as weeks for a school report, to many years for a professional certification.

Micro-credentials

In more recent times, a newer form of credential, the micro-credential, has demonstrated utility for organisations seeking to recognise learning of complex capabilities.³⁰ Micro-credentials do not have a standardised form and a range of other terms may be used also to refer to micro-credentials, such as micro-certs, nano-degrees, or badges.

The form of micro-credential relied on here adopts the approach introduced originally by the Mozilla Open Badges Infrastructure (OBI), an open-sourced platform that manages a network of entities and objects associated with digital badge credentials.^{31,32} A digital badge typically comprises a simple graphic, together with digital metadata, describing the criteria, standards and assessment required for credentialing, as well as other features, such as expiry dates, where and when the credential was earned and the identity of the assessor or warrantor. Extra digital information may be supplied to illustrate or amplify assessments, such as portfolios, videos of performances, examples of production, artefacts, essays and so on.

Micro-credentials do not have a standardised form and a range of other terms may be used also to refer to micro-credentials, such as micro-certs, nano-degrees, or badges.

Micro-credentials in this form have a number of key characteristics that make them suitable for recognising capabilities for learning. The main attraction is that they can be used as valid and reliable indicators of the level of attainment of complex capabilities, especially when aligned with developmental, performance-based assessment. Particular characteristics of micro-credentials include the following:

- » They provide a flexible means of certifying attainment of specific elements of learning, in contrast to those covered in conventional academic awards or subject records, which may provide little specific guidance about the actual capability of holders. Traditional credentials require 'seat time' in long courses of study, but do not assess key outcomes. A micro-credential targets specific learning and may not depend on any particular duration for learners to complete requisite work: it can apply to a week's work or to learning that takes many years. The key point is that the precise learning being certified is specified.
- » They are simple and easy to interpret by learners, teachers, parents and stakeholders, providing sufficient detail and precision about what learners know and can do, for specific capabilities and for particular purposes.
- » They can be used to recognise prior learning and are transferable to a range of contexts beyond the original credentialing context. They do not depend on a particular approach to the organisation of learning.
- » They can be 'stacked', so that a person can collect micro-credentials over time that can be designed to add up to a larger credential.

The OBI conception of a ‘badge ecosystem’ has also been adapted. This involves identifying formally anyone who has interests in any credential, including interests that may be competing. The idea of an ‘ecosystem’ assists in identifying how interests align, and how best these interests can be reconciled. These categories can include:

A credential issuer:

The organisation that creates a credential, defines the capabilities to be developed, sets standards for learning and ensures that the credential is trustworthy and meets stakeholder requirements and expectations. The issuer may be responsible also for performance assessments, but, in any event, must provide an interpretation of what individuals have learned and can do.

Assessors:

Provide expertise in assessment, the setting of standards or criteria, validation, calibration and warranting of attainment. They provide technical leadership and/or support to engender trust in the credential and underwrite aspects of quality.

Credential earners:

The individuals who earn the credential, by meeting the standards set by the issuer/s and assessed by the assessor. They produce the evidentiary base used to support judgment about their learning.

Collaborators and stakeholders:

Individuals and organisations, such as parents, employers, professional or industry associations, other endorsers and even sections of the general public, who have an interest in the information provided in the credential, or to whom an earner wishes to demonstrate their competence.

One reason for using micro-credentials in the ARC work is that they can be used to make visible the learning of complex outcomes, such as capabilities for learning, supplementing and, in some cases, bypassing the credentials typically used in senior secondary, vocational or university certificates, which are usually silent on the degree to which learners have attained capabilities. Micro-credentials have the flexibility, transparency and responsiveness to meet specific needs, without diminishing integrity and trustworthiness.

The highly elaborated OBI schema for defining micro-credentials and a micro-credentialing ecosystem is not universally accepted or desired. Critics point to the possibility that systematisation and structuring of formerly unstructured or informal learning risks devaluing un-credentialed learning; that more credentials are not needed; that micro-credentials might encourage gamification of learning that will undermine intrinsic motivation for learning; and that individuals already disadvantaged by lack of educational opportunity may be further marginalised.

Perhaps, other models and approaches might achieve the same ends, such as providers engendering an *expectation* that complex capabilities have been developed and assessed, though not explicitly specified, in standard reporting.

The organisations referenced in this study certainly did not all employ the fully elaborated ideal of a micro-credential. Some organisations, such as Beenleigh, are presently limiting their recognition to paper-based reports. Others, such as LVA and Big Picture, have adopted or are adopting a fuller approach (see the case-study profiles in Appendix 1 for further detail). Nonetheless, the idea that a micro-credential is useful in reporting detail about actual attainments in specific areas of interest to an ecosystem of stakeholders has currency for people working in this space.

Micro-credentials have the flexibility, transparency and responsiveness to meet specific needs, without diminishing integrity and trustworthiness.

Warranted standards

In the work of the organisations featured in this report, a strong warrant for credentials was sought. Issuers of micro-credentials wanted to give stakeholders reasons to trust the credential for what it is meant to recognise. Similarly, most organisations required referencing of reports and credentials to external benchmarks and standards, where available and comparable. Considerable effort was put into generating trust and comparability, as the organisations work towards achieving ARC’s ‘gold standard’ for a warranted and trusted micro-credential (see Figure 4).³³

A key strategy for engendering trust used by the organisations was to follow the methodology outlined in Figure 5. This methodology has in-built features that support trust: co-designing with stakeholders the definitions of what learners need to know and be able to do; agreeing with them on the form, purpose, value and utility of any micro-credential, report or profile; developing and testing high-quality assessment frameworks; mapping outcomes to existing standards frameworks, such as the Australian Core Skills Framework (ACSF) and Australian Qualifications Framework (AQF); designing assessments for authenticity, reliability, validity and interpretability; conducting formal quality checks; instituting internal moderation processes to assist in ensuring consistency of assessments; and so on.

In the absence of a widely understood standards framework or currency for recognising complex capabilities, some issuers also sought a strong *independent warrant* for their credential. For instance, in the case of Big Picture, an additional component of the warrant is to depend on endorsement of quality by a trusted authority, such as the University of Melbourne.

This methodology has in-built features that support trust: co-designing with stakeholders the definitions of what learners need to know and be able to do; agreeing with them on the form, purpose, value and utility of any micro-credential, report or profile; developing and testing high-quality assessment frameworks; mapping outcomes to existing standards frameworks, such as the Australian Core Skills Framework (ACSF) and Australian Qualifications Framework (AQF); designing assessments for authenticity, reliability, validity and interpretability; conducting formal quality checks; instituting internal moderation processes to assist in ensuring consistency of assessments; and so on.

The gold standard



The credential represents, with a specified level of precision, the degree to which the credential holder has mastered a specified capability or set of capabilities or competencies that have value and utility and are easily interpretable for the stakeholder. The issuer should provide evidence and a warrant, to that effect.

Figure 4. ARC's 'gold standard' for warranting micro-credentials.

Methodology for assessment and recognition of complex capabilities



Figure 5. Methodology for assessment and recognition of complex capabilities.

05.

Small-scale pilot testing



Trial and review assessments and guides



Refine/finalise assessments and related materials

06.

Large-scale testing and calibration



Assess candidates, collate and record evidence



Examine psychometric quality of assessments; calibrate



Calibrate assessments to establish performance benchmarks and cut points for credentialing referenced to external standards



Field test reports and credentials with all stakeholders



Finalise empirically verified assessment frameworks, guides, reports and credentials



Document validation and warranting argument and the reasons why the assessment is fair and trustworthy

07.

Implementation and monitoring



Feedback from stakeholders



Check feedback from learners



Check feedback from warrantors and assessors



Check real-world utility

Note on Element 3

Of the essence is to design creative and engaging assessment tasks, specific to the context. Tasks should elicit observable behaviours from candidates, to support judgments of learners' levels of competence and should allow individuals with different levels of expertise to demonstrate their competency. One task can be designed to target one or multiple indicative behaviours, for one or many competencies.

Note on Element 4

Of the essence is to ensure that any assessment documentation is easily interpretable, developmental, has utility for stakeholders, and allows for comparison to standards.

Note on Element 5

Of the essence is to ensure that the assessment materials and supplementary materials are comprehensive, clear and easy to use and that online functionalities work. Observations by assessment experts and focus groups support optimisation of stakeholder experience as well as utility.

Note on Element 7

Of the essence is to continue to monitor and improve the validity of the credential, i.e., is it credible, fair, dependable, trustworthy, sufficiently precise, interpretable, fit for purpose, balanced and proportionate, with no unintended consequences?

Examples of learner profiles in development

- 6.1 Prototype profile of readiness for professional practice
- 6.2 Student profile from Beenleigh State High School
- 6.3 Prototype ARC Chrysanthemum learner profile
- 6.4 Mastery Transcript Consortium sample profile

Final Candidate Report

Readiness Score: READY

Category	Progression	Scaffolds
Leading teaching and learning	Progression	Scaffolds
Developing self and others	Progression	Scaffolds
Leading improvement, innovation, and change	Progression	Scaffolds
Leading the management of the school	Progression	Scaffolds
Engaging and working with the community	Progression	Scaffolds

6.1

Learner Profile

GENERAL CAPABILITIES

- Communication & enterprising skills
- Citizenship, ethics & morality
- Critical & creative thinking
- Literacy
- Numeracy
- Knowing how to learn
- Entrepreneurialism
- Technology & design
- Health & wellbeing

THE DISCIPLINES

- The sciences
- Humanities & social sciences
- The arts
- Mathematics
- English
- Languages

MOHONOKY

Student self-assessment, completed by the student, and approved by the teacher, provides evidence of the student's current level of achievement in each discipline and general capability. The student's score is compared to the target score for each discipline and general capability. The target score is determined by the student's current level of achievement in each discipline and general capability.

6.3

Beenleigh State High School Learner Profile: John Citizen

Category	Level
English Communication	Sound
Privocational Mathematics	Sound
Social and Community Studies	High Achievement
Engineering Skills	Sound
Cart II Kitchen Operations	Competency Achieved
Cart II Sport & Recreation	Competency Achieved

QCE attained

Attendance 99%

Statement/Reference

John has been enrolled at this school since 27th January, 2015 and has had an excellent attendance record. He is a very friendly, outgoing person, who is well respected by both teachers and fellow students. John has been the school's representative for the past two years, serving as a role model for other students. His cooperative and positive attitude has been a great asset to the school's success. He has been a member of the school's Rugby League team and has been a member of the school's Chess team. He has also been a member of the school's Sports Council and has been a member of the school's Student Council. He has been a member of the school's Sports Council and has been a member of the school's Student Council. He has been a member of the school's Sports Council and has been a member of the school's Student Council.

State Manager De Borrolli
Mr Tim Ebbstein

Principal
Mr O'Hanlon

Year 12 Deputy Principal
Dr Donna Harvey

6.2

MTC Mastery Transcript Consortium Sample Profile: Juliet Guastella

Credit Profile

Distribution of credits earned by student

49

Transferrable Skills

- Self-knowledge
- Communication
- Problem-solving
- Teamwork
- Leadership
- Resilience
- Self-management
- Global awareness
- Health & Physical Education
- Personal Health
- Personal Safety
- Personal Wellbeing
- Personal Leadership

Transferrable Skills

- Self-knowledge
- Communication
- Problem-solving
- Teamwork
- Leadership
- Resilience
- Self-management
- Global awareness
- Health & Physical Education
- Personal Health
- Personal Safety
- Personal Wellbeing
- Personal Leadership

Transferrable Skills

- Self-knowledge
- Communication
- Problem-solving
- Teamwork
- Leadership
- Resilience
- Self-management
- Global awareness
- Health & Physical Education
- Personal Health
- Personal Safety
- Personal Wellbeing
- Personal Leadership

6.4

Figure 6. Examples of learner profiles in development.³⁴

Learner profiles

Commitment to the idea of a learner profile was strong in many of the projects described in this paper. Figure 6 shows examples of learner profiles in development. The first example (Figure 6.1) is a prototype Final Candidate Report developed for the VAPA project. While the final form of the reporting is not yet finalised, the prototype was designed to highlight a candidate's level of readiness in five different professional practice areas, as illustrated by the black dot on each blade in the propeller-shaped figures.

The second example (Figure 6.2) is a Learner Profile from Beenleigh State High School in Queensland, Australia. The Learner Profile captures a range of information about the student, such as the student's performance in academic subjects, qualifications attained, attendance rate, level of competence in employability skills and badges from other achievements and participations.

In the third example, the Assessment Research Centre 'chrysanthemum' prototype learner profile provides an overview of a learner's level of competence in different domains and disciplines. The design allows the use of different shapes and colours to represent different categories of skills and competencies. The concentric circles aid comparability by referencing standards. Changes in levels across time can also be represented in the figure using solid lines within a 'petal'.

The elegant Mastery Transcript is the fruit of much work by schools in the US under the auspices of the Mastery Transcript Consortium. They have privileged attainments, judged by schools, in the general competencies, with information about more traditional programs and out-of-school program represented around the core. Each one of these Profiles has a lot of work behind them, covering stakeholder consultation, assessment design, having students undertake performance tasks, design of metadata, conduct of professional training, building of evidencing systems, and so on.

Designing assessments and credentials

Robust methods for assessing and recognising capabilities for learning are emerging. These enable reporting of levels of competence that can be trusted by learners and stakeholders external to the immediate credentialing environment. As argued previously, the kinds of assessment methods common in schools, including standardised tests, exams, essays and short-form quizzes, are insufficient.

The methodology adapted by many organisations profiled in this paper involves a multi-element process developed by the ARC, as outlined previously in Figure 5. It is based on the definition of assessment provided earlier (see Figure 3). It uses judgment-based, developmental and standards-referenced assessment methods, to generate evidence elicited from the performance of complex tasks, in and across domains of learning. Each capability is conceptualised carefully as an ordered sequence of teachable, increasingly sophisticated constellations of behaviours that are described in progressions or continua.

The kinds of assessment methods common in schools, including standardised tests, exams, essays and short-form quizzes, are insufficient.

At the core of any progression is the idea of emerging competence in the performance of challenging tasks. Such progressions can be used to devise a practical assessment framework for any capability, suitable for use in particular contexts. Synthesis of evidence from multiple sources and generated in a range of contexts is required. Using evidence from performances, moderated judgments can be made by teachers and others. Micro-credentialing processes provide the tools and ways of thinking that are helpful in understanding the characteristics of a credential; one that will be trusted to represent the degree to which a person has attained a complex capability.

The degree of mastery should be referenced to common standards, be represented in an easily interpretable manner and be comparable to other forms of recognition of the same capability (or equivalent). Learner profiles can be generated as a useful way to provide readily interpretable reports on the full range of student attainments.

Most of the organisations whose work is described in this paper started from scratch in the development of their assessments, reports and credentials. They started at Element 1 of the methodology (see Figure 5) and proceeded, often in untidy stop-start loops, to get the result they wanted.


Nevertheless, the methodology is robust and supports the argument for the trustworthiness of the credentials generated. The process is not linear: it is typically iterative. It can be used by any organisation to assess capabilities for learning or other complex competencies, be these schools, official authorities, professional associations or universities.

Not every organisation can or should adopt all of the elements of the methodology, as not every organisation is seeking to establish the highest level of warrant for a credential that would hold up, for instance, against standards for assessments set by regulatory authorities. However, each organisation in this paper used an approach informed by the methodology, adapted to reach the level of precision and trust they required for their purposes.

The whole process can be quite lengthy. In the LVA and VAPA projects, for instance, the first element itself required a number of workshops with a range of stakeholder representatives. These workshops were conducted over many months, providing stakeholders with the opportunities to understand the purpose, value and utility of the planned work. For other smaller-scale projects, such as those conducted within a school, the first element can still take a few months.

Communication Skills Assessment Framework

Communication skills: How people deliver and receive information so that the message is understood

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Quality Criteria (low to high)</p> 			3.3 Tailors method of delivery to suit circumstances	4.3. Adapts own style to suit audience and context	5.3 Adapts pace within changing context
	1.2 Considers context and audience when delivering content of message (e.g., simplifies language)	2.3 Draws on content and context when timing delivery	3.2 Matches method to audience or content of message	4.2 Matches style to context and audience	5.2 Matches pace to context
		2.2 Follows protocols/policies			5.1 Uses consistent pace
	1.1 Relays message	2.1 Delivers message without consideration	3.1 Uses personal preference	4.1 Uses delivery style that is comfortable	
	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence
Indicators	1. Delivers content of message	2. Times delivery of message	3. Selects method of delivery (e.g. email, phone call, face-to-face)	4. Selects delivery style (e.g. tone, appearance, volume, etc)	5. Paces delivery
Skills or Capabilities	Delivers message				

Progression

6.4 Varies language based on audience reactions	7.3 Redelivers message to confirm understanding		9.3 Transforms interaction into positive for all parties involved	At this level, individuals adapt or tailor their communication method and style to maximise the impact on their intended audience. They adapt/tailor their delivery method and style in response to audience needs and reactions and to the circumstances surrounding the context of communication. In delivering messages, they make judgments about the level of understanding of their audience using information gathered through the checking process and re-deliver the message to help their audience reach understanding, if required. They transform the interaction into positive for all parties involved when resolving issues.
6.3 Matches language to suit audience	7.2 Determines level of understanding (of audience)	8.2 Uses checking strategies to seek clarity (e.g. checks details, repeats message back/ asks questions)	9.2 Proposes solution for potential issues	At this level, individuals consider the context and audience when communicating with others. They time their delivery and match their delivery methods, delivery styles (e.g. tone, volume, pace, language) and the content of the message to suit the audience and context. They make judgments about the level of understanding of their audience. In responding, they use checking strategies (e.g. repeating message, asking questions) to seek clarity and propose solutions for potential issues.
6.2 Uses a recognised standard within organisation	7.1 Asks questions to clarify audience understanding			At this level, individuals start to demonstrate consideration of the audience and context. In delivering messages, they follow set protocols or policies and consider recognised standards within the organisation. They tend to use a consistent pace to deliver their message. They ask questions as a way of checking understanding of their audience.
6.1 Uses language based on personal preference		8.1 Acknowledges response	9.1 Acknowledges potential issues to be addressed	At this level, individuals react and respond to communication situations. They tend to use a single or default method of delivery in all situations, without considering the audience or context. They only acknowledge others' responses and potential issues.
Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Level statements
6. Considers language use	7. Checks whether intended message was communicated	8. Checks for understanding	9. Manages response	
Delivers message		Manages own response to audience's reaction		

Figure 7. A sample assessment framework for Communication Skills from Phase 1 of the LVA-ARC collaboration.

Assessment frameworks

Regardless of the purpose or final outcome of the process, every project developed a quality assessment framework (see Element 2 in Figure 5) for each capability of interest. Figure 7 illustrates a sample assessment framework for Communication Skills, adapted slightly from Phase 1 of the LVA collaboration with ARC. Frameworks such as this are used to guide the design of assessment tasks as well as the collection, generation and sense-making of evidence of learning. Further, an assessment framework can inform teaching and learning, as it clarifies the teachable behaviours that correspond to a learning progression of increasing complexity and sophistication.

The organisations featured in this paper preferred to develop their own bespoke assessment frameworks; they required their own behavioural indicators and quality criteria (i.e., how well the behavioural indicators are performed), despite the presence, in some cases, of generic or off-the-shelf resources available from various education departments and authorities.

The Australian Government is investing in the development of generic progressions for literacy and numeracy and similar materials have been developed by the ARC and the Australian Council for Educational Research (ACER), for example. A range of progression-like materials, generic and specific, of high or low quality, was used as resources and references for adaptation rather than for wholesale adoption. This was due in part to the fact that the big developmental ideas needed to define a progression were rarely evident in off-the-shelf materials: often, the progressions were in fact a list of behavioural indicators.

Further, the development of bespoke assessment frameworks and progressions generated ownership within organisations, ensured that stakeholders (including teachers) had a shared understanding of the meaning and intent of the recognition and supported sensitivity to particular contexts.

Performance tasks

The development of performance tasks (see Element 3 in Figure 5) in a school context requires ingenuity. In many respects, it is the most challenging part of the whole process. For example, how does one present real, ethical challenges for a student so that their performance can be observed and reflected on by themselves and others? How does one generate a truly collaborative task in History or Mathematics, ensuring that all students work together, even when performing different roles? How does one assess intercultural capability and the ability to adapt to diverse perspectives if the school is largely 'monocultural'? How does one design a task that requires problem-solving skills applied to unfamiliar and ambiguous circumstances?

In the VAPA and LVA projects, for example, assessment designs made use of 360-degree assessments from peers and/or supervisors who had been in a position to observe the candidate in a work environment. These were combined with other internet-based elements, including expert assessment of portfolios, automated objective tests of knowledge and automated performance tests used for moderation. Technology (app) support was provided to assessors and candidates. This design ensured that the process could be scaled, over time and distance, to cover large numbers of candidates within budget.

By contrast, the Big Picture assessment tasks built on their 15-year history of adopting a novel organisation of learning. Learning tasks revolve around students constructing a graduation portfolio, compiled over their years of study.

The portfolio includes an autobiography, a thesis, details of participation in community service and paid employment, as well as more traditional academic pursuits. For certification, these artefacts became the focus of careful, formative, rubric-based judgments made by expert teachers who have close, day-to-day contact with students over an extended period of time.

At graduation, these judgments are carefully synthesised, to form an overall judgment on the level of attainment across all aspects and on each of the core learning requirements.

Draft assessments and supplementary materials are typically reviewed by panels of specialists or content experts, who will check alignment of tasks and items with the specified behavioural indicators. They review the language of the materials to ensure suitability for the chosen context and end users. The review process incorporates identification and amelioration of potential issues in administration, timing, scoring and documentation of assessment results. This review process may be repeated several times and assessment materials are revised and updated based on feedback provided by the reviewers.

How does one present real, ethical challenges for a student so that their performance can be observed and reflected on by themselves and others? How does one generate a truly collaborative task in History or Mathematics, ensuring that all students work together, even when performing different roles? How does one assess intercultural capability and the ability to adapt to diverse perspectives if the school is largely 'monocultural'? How does one design a task that requires problem-solving skills applied to unfamiliar and ambiguous circumstances?

The technology

The workload associated with designing and implementing this approach to assessment and recognition of complex capabilities is high, often shared among stakeholders, designers, credential designers, progression builders, assessment task managers and assessors. The use of technology is essential.

To support this challenging work, the University of Melbourne made available to its partners an app (RUBY), to supplement standard assessment applications. Processes supported by RUBY not typically supported elsewhere include: management of customised assessment frameworks and their relationship to generic progressions, or standards; management of overlapping progressions, common indicators and standards; management of different types of assessment evidence, drawn from multiple sources; management of judgments made by multiple assessors and synthesising these against levels of attainment for individuals and groups; highlighting Zones of Proximal Development (ZPD) and Zones of Actual Development (ZAD) for individuals; integration of advice on teaching and learning ideas into student reporting; profiling attainments of learners and groups of learners; integration of benchmarking for micro-credentials; integration of assessment and reporting features into customised assessment sites; and, integration of psychometrics services for quality testing of customised assessments.

Standards

Mapping of assessment to commonly understood standards is critical to building trust. Accordingly, one issue facing all organisations featured in this paper is that Australia's education system still has a very underdeveloped way of thinking about standards for learning capabilities. Few reference points exist that could be used to benchmark standards. Literacy and numeracy standards are exceptions, as well as the pioneering work of research organisations on some aspects of competencies assessment.^{35,36} Other exceptions are the complex capability for learning assessments in SWANs, which were subject to large-scale, rigorous and formal calibration by the ARC in order to establish standards. The SWANs progression levels were used to inform the establishment of standards for Levels A to D leading in to the Foundation-level curriculum in Victoria.

One issue facing all organisations featured in this paper is that Australia's education system still has a very underdeveloped way of thinking about standards for learning capabilities. Few reference points exist that could be used to benchmark standards.

Some other projects were able to map to existing standards to their progression levels. For example, VAPA is referenced against the Australian Professional Standard for Principals and Big Picture's work will be referenced to common standards linked to the ACSF and the AQF. See Appendix 1 for more detail and examples.

Validation

Every effort is made throughout the process to validate assessments. Continual effort to identify reasons to doubt the assessment's fit for purpose is essential. Ideally, Element 6 (see Figure 5) is rounded off by compilation of those reasons, with a fair and honest assessment of areas of doubt together with the counter case of why the assessments can be trusted. This is called a validation argument. This argument specifies the dependable use and application of the credential, provides guidance on its interpretation and highlights any possible limitations that should be considered when interpreting and using the results.

It is worth noting that the work of validation is never complete. Proper evaluation and monitoring of a credential's fit for purpose and effectiveness often takes time and any required adjustments should be considered normal.

For instance, time will tell whether employers continue to trust that a credential will successfully predict future success, or whether a candidate can count on the credential when being considered for selection or recruitment. The value a stakeholder places on a credential might suddenly change as circumstances vary;

candidates might find ways to cheat, or otherwise circumvent the intention of the credential; the approach might even have unintended consequences, such as devaluing alternate ways of seeking entry to an opportunity.

Time will tell whether employers continue to trust that a credential will successfully predict future success, or whether a candidate can count on the credential when being considered for selection or recruitment.

04



Lessons learned

It is now curriculum policy in many countries that schools and other educational organisations situate complex capabilities for learning at the heart of their teaching, learning and assessment. This section explores the lessons learned about scaling such efforts, based on the case-study profiles of innovative practice (see Appendix 1).

Benefits and costs

The organisations featured in this paper are energetic innovators. Their work has been typically years in the making and involves reimagining educational opportunities for their students and stakeholders. The SWANS program of assessments took nearly a decade of combined efforts by the University of Melbourne and the Department of Education and Training Victoria, tapping into the deep experience of many schools and hundreds of teachers. The assessments are now in use in six school systems and many other schools nationally. Similarly, the credential for Big Picture builds on 15 years of success with students who were not thriving in standard senior secondary programs of study.

Smaller scale, school-based initiatives described in the paper were based on the long-standing determination of their leaders to strengthen educational opportunities for all learners. Each initiative involved prodigious effort by teachers, school leadership and interested stakeholders, rethinking the curriculum, the organisation of learning and assessment and recognition.

Proportionality

It is important to dispel any impression that adoption of a robust approach to assessment and recognition will necessarily lead to the counterproductive domination by assessment of the educational process. There are instances in Australia and elsewhere of such disproportionality. NAPLAN, PISA and the ATAR have all been criticised on the grounds of skewing teaching and student experience, making teaching too instrumental and focused on narrow performances captured in the tests and overwhelming deeper and more valuable outcomes of schooling with accountability for results on standardised assessments.³⁷

Two key points about proportionality arise from the initiatives described in this paper. First, ensuring the robustness of assessments need not lead to the dominance of assessment that skews teaching and learning efforts; quite the contrary. For Big Picture and Beenleigh, for instance, the aim is to have assessments fully in tune with the rhythms of normal teaching and learning. In the case of VAPA and LVA, the assessments are one-off, developmental and episodic, intended to be manageable in terms of workload for all concerned and designed principally to assist a candidate when they are seeking to change their roles or professions.

Second, the robustness of the assessment design is a way to guard against disproportionality. Assessments and credentials designed using the described methodology (see Figure 5) are sensitive to context, built on inputs by all stakeholders and use authentic, performance-based measures. These assessments and credentials are, by virtue of the care put into their development, in tune with the teaching and learning environment.

It is notable that the majority, but not all, of the innovations described in this paper has been focused on secondary or post-secondary education, particularly the transition from school to work. This can be regarded as a form of proportionality, that is, putting effort where it is most required. Pedagogies and learning organisation in primary schools are already more aligned to the development of complex capabilities. The primary years help students to develop essential and transferable social and emotional capabilities. In this context, it seems that there is an argument for giving greater attention to formal assessment and recognition of learning capabilities in the lead-up to transitions. The needs of secondary students and those transitioning from one phase of education to another are becoming more acute.

‘Proportionality’ should be regarded as a key requirement of all assessment in education, as important as reliability and validity and utility and interpretability. A light touch is better than a heavy one, and developmental is better than one-shot, high-stakes assessment.

Assessments that are integrated seamlessly with learning generate the most effective results for learners, candidates, recruiters and assessors.

Exacerbation or amelioration of educational disadvantage?

The question often arises as to whether or not incorporation of capabilities into assessment and recognition and the use of learner profiles, might entrench educational disadvantage. It is argued that students from socially advantaged communities have more social capital to draw upon and will have greater access to life experiences that help with the development of complex capabilities.

By and large, the organisations featured in this paper did not accept that position. Rather, they are of the view that the teaching, assessment and recognition of capabilities makes explicit the nature of these capabilities, which can be learned both in or out of schools and in any community. Assessment and recognition make visible the goalposts for learning that might otherwise be implicit, unrecognised by learners who have little in the way of cultural capital required to *claim* and *have recognised* their capabilities. Providing a common, trusted and fair approach to demonstrating capability will not disadvantage students and may well do the opposite.

A related view is that learner profiling provides a means for individuals to monitor their own progress, to better understand their strengths and weaknesses and to recognise the value of the capabilities they have or should attain in, or from, any context. It would provide a tool for learners to take more control of their own learning, a powerful antidote for the disengagement and lack of confidence that at times characterises learners from disadvantaged backgrounds.

Systemic support

Other than monetary funding, the organisations featured in this paper were unable, in the main, to rely on systemic support for the work they undertook. A touchstone for judging the adequacy of systemic support is a comparison with the level of support provided for schools assessing and recognising discipline-based or content attainment of students at senior secondary, or in the assessment and recognition of general capabilities like literacy or numeracy. In these cases, clear curriculum statements or progressions, albeit instrumental and thin, exist.

Exemplars of student work that illustrate different standards and common assessment tasks are available; boards of experienced examiners abound, providing teachers with the relevant training; moderators support comparability in assessments; there are also extensive frameworks of rules, regulations and agreements supported by a range of official organisations in each jurisdiction, including curriculum and assessment authorities, education departments and tertiary admissions centres. These organisations play an important role in the community, helping everyone to interpret what is meant by the reports and certificates that emerge.

However, few of these kinds of resources are available to support assessment and reporting of learning capabilities by schools and other educational institutions. A recent review of the AQF examined this issue for the tertiary education sector. It highlighted the lack of standards and currency for 'short-form credentials', including those that might be used to report attainment of general capabilities. It found no common currency that can be used to guide interpretation. The review proposed that the existing tertiary education regulators in Australia should provide guidance on quality assurance for the purpose of determining the credit that such a credential might earn towards a traditional qualification. The review suggested that to earn credit for an award course, any credential should provide a summative assessment and have a means of verifying identity at the time of assessment.³⁸

It should set out learning outcomes for consideration by the crediting institution, specify a minimum volume of learning and a purpose, showing its potential utility. It should be subject to a verifiable internal or external quality assurance process.

For schools to manage an assessment and recognition program, assessors and issuers of credentials will need systemic support. Such support should include technology of greater sophistication than is currently available in most places.

A common framework of standards for benchmarking attainments and agreement on a common currency for reporting are required, including the format for learner profiling. This needs to be of equivalent utility to what is now available for moderating and comparing the attainments of students in subjects that contribute towards obtaining senior secondary school certificates.

Three approaches to teaching and the organisation of learning

The focus of this paper is assessment and recognition, not pedagogy or the organisation of learning. However, it is evident that changes to assessment and recognition are concomitant with changes in the organisation of learning. This observation is entirely consistent with understandings about how people learn to be competent, as distinct from becoming merely knowledgeable. Figure 8 summarises one representation of the learning environments that people need as they develop expertise in any domain.³⁹ The main message is that high levels of competence are not realised in lessons that focus on an individual's cognitive skills, no matter how cognitively demanding.

A taxonomy of approaches to the organisation of teaching capabilities can be observed in the industry at present, as depicted in Figure 9. At one end of this taxonomy is the use of a *supplementary* approach, in which easily implemented add-ons are adopted within a school.

Examples include creation of innovative new subjects, such as a course on entrepreneurialism, use of extended research projects, or work experience and camps. In such cases, innovative approaches to teaching and the organisation of learning are sometimes developed. This is a very manageable approach for schools, as it essentially quarantines the reform effort to one part of the organisation and leaves the rest of the organisation largely unchallenged.

The *adaptive* approach describes situations where responsibilities for developing complex capabilities are given a dedicated space within the current organisation of learning. For instance, critical thinking is sometimes aligned with Science and History, communication is tied to English and ethical capability is linked to Philosophy.

The rationale is that teachers in these areas already teach for these capabilities and can easily extend and recognise student attainments. In this approach, some capabilities, such as knowing how to learn, become everybody's or nobody's responsibility. The advantage of this approach is that it demands most teachers to engage with at least some of the capabilities. However, it may not give full rein to the idea of capabilities as transferable and broadly applicable. It also tends to conserve the existing patterns of school organisation and hence pedagogy and student engagement. Beenleigh is probably an unusually successful, yet ambitious, example of this approach (see Appendix 1).

At the peak of the taxonomy is a *reformist* approach. In this approach, new organisational designs for learning are applied in order to optimise opportunities for learners to develop complex capabilities. This includes, for example, bypassing traditional approaches to credentialing so that candidates do not have to enrol in classes. This unbundling of teaching and assessment essentially recognises prior learning regardless of where it has been learned.

This approach is characteristic of both the LVA and VAPA initiatives. Neither initiative has a course of study attached to the assessment or credential.

Any person may participate and earn the credential, at no cost and development support for assessed individuals is expected to come from other sources, such as employers, or the local schools and colleges. Another reformist approach is illustrated by the Big Picture example described earlier, with further detail included in Appendix 1.

Final word

To have every student develop and have recognised a range of capabilities for lifelong learning is not a small ask of schools and other education bodies. It is likely that these organisations would take some years to adapt or reform the organisation of teaching, learning and assessment in order to optimise opportunities for students.

As the innovations profiled in this paper have shown, it is simply not feasible to play around the edges of current practice, with only minor adjustments to teaching and assessment, if the goal is to generate trust that individuals are mastering complex learning capabilities as part of their day-to-day endeavours.

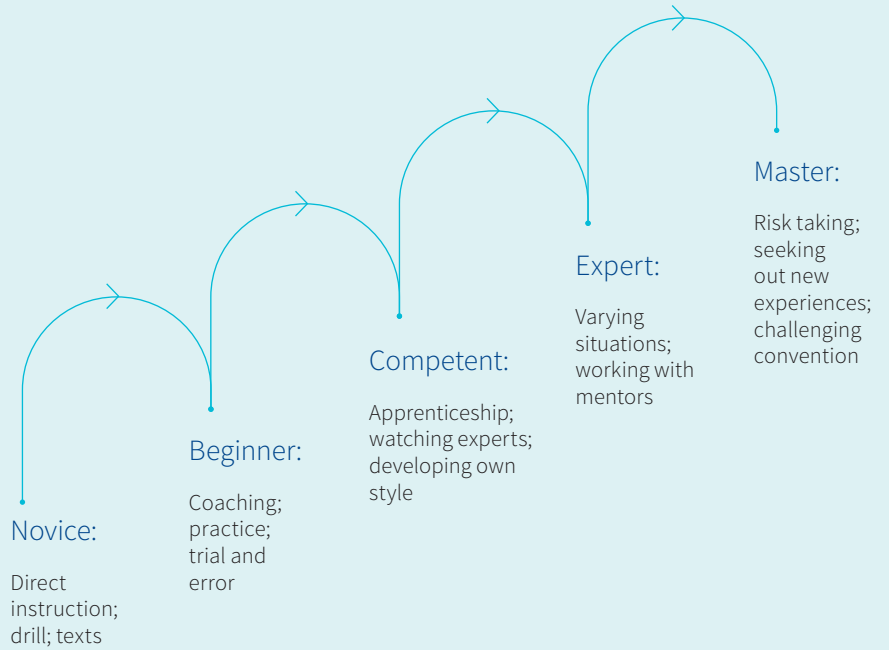


Figure 8. Learning environments required for developing expertise in any domain.

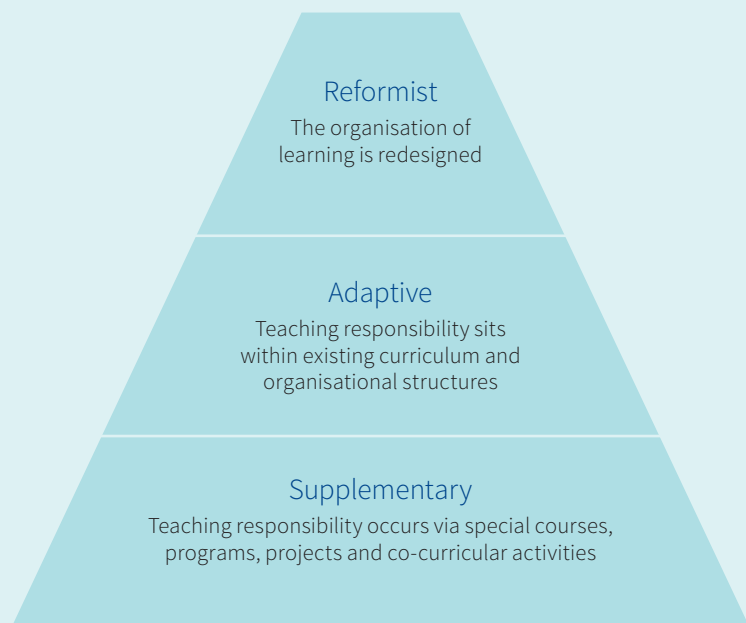
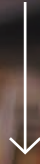


Figure 9. A taxonomy of approaches to the organisation of complex capabilities teaching.

Appendix 01



Case-study
profiles

01. Micro-credentials to certify the achievements of Big Picture Education Australia graduates

Organisation

Big Picture Education Australia (BPEA), in association with the University of Melbourne

Aspiration

Big Picture Education Australia's key goal is to address the lack of relevance and engagement that many young people are experiencing in education; to help students from all walks of life to experience learning that is free from the constraints of timetables, subject offerings and pre-determined curriculum; to connect with opportunities to explore their interests in the wider world outside the classroom; to nurture aspiration; to accrue practical experience and social capital; and to make successful transitions to post-school life.

BPEA is part of an international network that originated in the United States in 1997 and now has members in the United Kingdom, New Zealand, Canada, Italy, The Netherlands and Israel. Building on 20 years of research and experience in Australia and overseas (<https://www.bigpicture.org.au/research-projects>), the BPEA design for secondary schooling has re-designed the 'grammar' of schooling, from pedagogy, curriculum and organisational culture, through to assessment and now graduation credentials.

In Australia, BPEA does not run schools, but works with education systems to implement its design, either on a whole-school basis or as an academy within a mainstream school for students from Years 8 to 12. The design offers a set of 12 Distinguishers that describe the values, structures, relationships and learning practices that define a Big Picture campus.

All students develop their own learning plans with guidance from their advisor and family that allows them to experience learning that is intrinsically motivating. Research has shown that passion-based learning and increased student autonomy can increase engagement, motivation and perseverance, while also developing positive qualities, including independence, self-regulation and confidence. Interest comes first; projects are then developed around this interest and the learning is mapped to five learning goals and to the national curriculum.

Students belong to small, supportive learning communities known as an Advisory, with a single teacher and 17 students. While each student is unique, they are not alone. They work both as a group and individually, on social-action and personal-interest projects. They also pursue internships in the community with an expert mentor who can introduce them to the latest thinking and technology in a field of interest.

BPEA's approach is strengths-based and uses capability-based assessment via portfolio and exhibition to allow students to demonstrate what they can do and how they have changed over time. Students are also formally encouraged to reflect on their learning regularly and to plan where to go next. The emphasis on inclusion is also apparent within the BPEA design; each student feels 'known' and respected, thus enhancing student wellbeing. BPEA schools have a track record of generating high-performing learners who display 21st-century competencies, such as teamwork, problem-solving, commitment to social justice and lifelong learning.

There is growing recognition of the BPEA approach, with over 14 universities around Australia participating in its Graduation Portfolio program. As part of this program, BPEA students can apply for undergraduate entry in fields of deep interest on the basis of the evidence in their Graduation Portfolios that they present to a university panel. Vocational training providers and employers are also accepting BPEA graduates based on a testimonial of competence provided by their BPEA school, backed with evidence from their Graduation Portfolio and Exhibition.

As interest and participation in the BPEA approach grows, the BPEA Board and school leaders have recognised that their challenge is to scale their efforts. Their aspiration is to formalise their certification system, to provide a widely recognised and trusted warrant of each learner's achievements.

In partnership with the Assessment Research Centre (ARC), BPEA is designing a Certificate, or Learner Profile, to provide a representation of the accomplishments of each learner, built from micro-credentials linked to evidence, referenced to external standards and in a form that is easily understood by tertiary education providers, employers and the learners themselves.

What is being assessed?

The BPEA design is centred around five Big Picture Learning Goals that underpin its education philosophy: Empirical Reasoning, Social Reasoning, Quantitative Reasoning, Communication and Personal Qualities. A core set of six micro-credentials relating to complex capabilities are in development. The five Learning Goals are each conceptualised as a complex capability and a sixth capability, Knowing How to Learn, has been included.

Draft learning progressions for three competencies – Empirical Reasoning, Social Reasoning and Knowing How to Learn – have been designed and are undergoing psychometric testing. The progressions are developmental, each typified by a series of behavioural indicators that can be performed at four or five levels of proficiency.

Who is being assessed?

Big Picture students in Years 9 to 12 will be assessed regularly. The assessment schedules may be personalised for each student, coinciding with significant learning episodes. Assessments will be guided by the learning progressions for the six micro-credentials, drawing on learners' Graduation Portfolios and Exhibitions as evidence of levels of performance.

Stakeholders

The primary stakeholders for this initiative are universities, training providers and prospective employers. The micro-credentials will be also of interest to parents, carers and extended family, who will be able to track learning progress on each micro-credential over the course of secondary schooling.

Standards referenced

The learning progression levels within each micro-credential will be referenced to common standards linked to the Australian Core Skills Framework (ACSF) and the Australian Qualifications Framework (AQF).

This will provide a 'currency' that enables the scope and nature of the micro-credentials to be understood in terms that are familiar to stakeholders.

How is it being assessed?

A key feature of the BPEA design is that students compile evidence of their learning in a Graduation Portfolio. The evidence focuses on authentic learning in context. A framework for the development of the Portfolio is provided to students and includes elements such as a Senior Thesis based on an independent project, an Internship Project, an Autobiography, products and feedback from a series of exhibitions, a Social Action Project and a Post-School Plan.

Typically, the Graduation Portfolio is developed over three years (Years 10–12), during which students regularly present and defend their work at 'checkpoint' exhibitions before a panel that may include their Advisory teacher, mentors, the principal, a family member and peers. The panel members provide feedback and evaluate the student's progress using the learning progressions for the six micro-credentials. Prior to graduation, the students present their curated Graduation Portfolio and hold a final Graduation Exhibition, where their accomplishments are evaluated rigorously by a panel that may include teachers, the principal, an academic, a trainer and an employer from the student's area of interest.

Final judgment on the level a student has reached on a micro-credential progression depends on an accumulation of assessments and evidence drawn from a range of sources integral to the student's learning, moderated by a range of assessors. To ensure the comparability, reliability and validity of the assessments, a suite of training resources, procedural manuals and exemplars are being developed. These materials will also support the accuracy of calibration to the external standards.

Nature of the micro-credential

At graduation, each student will receive a Big Picture Learner Profile, which will provide a rich representation of their development in the capabilities. The Learner Profile will represent the student's final level of achievement against each of the micro-credentials, linked to evidence from their Portfolio and referenced to external standards reflecting the AQF and ACSF. The Learner Profile may also include other relevant achievements of the student, some of which may be represented in credentials that have been certified by other reputable bodies.

The Learner Profile will be presented in digital form, enabling each micro-credential to be linked to evidence drawn from the student's Portfolio. To support the interpretations of stakeholders, metadata will be included, providing information on the capabilities developed, linkages to the external standards and how, when, where and by whom assessments were conducted.

BPEA will be the issuer of the Learner Profile. The University of Melbourne, through the ARC, will calibrate and warrant the assessments made against the six micro-credentials, to ensure the quality and trustworthiness of the Learner Profile.

Technology support

In the design and management of the assessment and certification processes, ARC's RUBY digital assessment platform will support the work of teachers, school leaders, assessors and stakeholders.

The platform will support BPEA in:

- » the management of the set of micro-credentials, with associated progressions, behavioural criteria, exemplars and metadata
- » the management of student assessment data linked to the learning progressions, collected over time, from a range of assessors, using multiple sources of evidence and generated in a variety of learning contexts
- » moderation and processes to ensure the comparability of assessors' judgments

- » linking assessments to an evidentiary base captured in a student's digital Portfolio
- » drawing assessment information together into a Learner Profile, including generating metadata to support the interpretations of stakeholders
- » issuance of the Big Picture Learner Profile
- » regular maintenance and review of the certification system to ensure the credentials remain useful and trusted.

Micro-credential applications

The BPEA micro-credentials reflect the unique design, values and purpose of the BPEA approach to education. Although complex, these make visible, through learning progressions, the competencies that students are developing at school. The micro-credentials will provide a consistent, standards-based assessment framework that can be applied across the highly personalised learning programs of each Big Picture student. The design and the assessment model support the student's capacity to transfer these complex competencies across a range of domains and contexts through the completion of diverse tasks.

State of play

It is anticipated that the first round of Big Picture Learner Profiles will be issued to graduates in December 2020.

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02. Redesigning assessment specifications for the Graduate Diploma of Chartered Accounting

Organisation

Chartered Accountants Australia and New Zealand (CA ANZ)

Aspiration

A major challenge for 21st-century education in accounting is to ensure the continuing relevance of accountants in a workforce where many of the traditional functions of their profession have become automated. To add value to their workplaces, accountants are seeing the need to redefine their roles. In addition to being skilled in traditional accounting processes, they need to be proficient critical thinkers, problem-solvers, innovators, communicators and collaborators. Moreover, to meet present-day norms, their engagement with colleagues, clients and communities needs to be socially responsible and constantly adaptive to change. Perhaps the most valuable asset they can acquire, given the rate of social and technological change in the 21st-century, is a capacity for lifelong learning. Unpredictable developments, even those in the relatively near future, are likely to impact on their profession in ways that will require agile approaches to the acquisition of new knowledge and skills.

In response to these challenges, Chartered Accountants Australia and New Zealand (CA ANZ) are redesigning their Graduate Diploma program to incorporate a range of generic or professional skills and an emphasis on lifelong learning (CA X Program High-Level Design draft, 2019). This is a significant development that involves rethinking the CA program experience from the ground up as CA ANZ aims to provide greater relevance and value for its members and the community by responding to these changing market needs and technological trends. From a candidate perspective, this will involve undertaking case work with a real-world focus, through authentic situational challenges and simulations that effectively integrate generic or professional skills as part of the education program.

What will be assessed?

CA ANZ describes generic or professional skills as graduate attributes. Graduate attributes are characteristics that represent

the knowledge, skills and dispositions that graduates have and that they will continuously develop and demonstrate throughout and beyond their program of study. These attributes are not simply taught but developed through meaningful experiences and reflection. The new CA X program incorporates eight key graduate attributes:

1. Ethics and integrity
2. Critical thinking and judgment
3. Adaptive mindset
4. Accounting technical expertise
5. Communication
6. Collaboration and relationships
7. Problem-solving and decision-making
8. Digital and data acumen.

Who will be assessed?

The assessments will apply to candidates who enrol in the new Graduate Diploma in Chartered Accounting, currently being designed.

Stakeholders

The primary stakeholders of this initiative are CA ANZ students and members, accounting firms and businesses and organisations seeking to employ chartered accountants.

Standards referenced

The planned Graduate Diploma of Chartered Accounting is under development as a Level 8 qualification on the Australian Qualifications Framework (AQF). CA ANZ is a registered Higher Education provider and as such is required to comply with the Tertiary Education Quality and Standards Agency Act (TEQSA Act) and associated legislation, including the Higher Education Standards Framework (Threshold Standards) 2015. The Threshold Standards set out the requirements that a higher education provider must meet in order to be registered by TEQSA and operate in Australia. One of the requirements is that a provider must specify the learning outcomes of each course of study and that these learning outcomes encompass discipline-related and generic outcomes, including

generic skills and their application in the context of the field or discipline. CA ANZ is also a member of the Global Accounting Alliance (GAA). Therefore, the planned CA program must comply with the GAA principles framework, which specifies requirements of a professional education program, including, for instance, assessment requirements and practical experience opportunities.

How will it be assessed?

A range of tasks, such as presentations, written reflections/reports and workplace simulations will be included to assess candidates' graduate attributes.

As part of the redesign process, the Assessment Research Centre (ARC) collaborated with CA ANZ to develop assessment specifications that describe:

- » the kinds of assessment that could be used to assess core technical knowledge and transferable generic or professional skills
- » how the assessments could be delivered (e.g. in person, online, at time points within each program module, etc)
- » the weightings to be allocated to different assessments
- » how the assessments would be marked (e.g. automated, marked by facilitator or assessor)
- » how academic integrity can be ensured.

State of play

The specifications for assessments were finalised in August 2019. The CA ANZ team is applying the specifications to the design of assessments for its new Graduate Diploma to be launched in 2021.

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03. Micro-credentialing of Enterprise Skills in Gippsland, Victoria

Organisation

The Latrobe Valley Authority (LVA),
Victoria, Australia

Aspiration

Families, workers and businesses in the Latrobe Valley region (Victoria, Australia) have been experiencing work-related disruptions and challenges from the restructuring of long-standing local industries, due in part to the forces of globalisation, increased automation, low levels of educational attainment and other socio-economic factors, such as poor population health. The region has a population of approximately 73,000, 18.6 per cent of whom are over 64 years of age, which is slightly higher than the Victorian average of 15.6 per cent. Unemployment for those aged 15 years and over is running at 9.7 per cent, compared to a national average of 6.9 per cent.⁴⁰

The LVA has identified opportunities for growth in a number of industries, most notably health and community services, food and fibre, advanced manufacturing, construction, tourism and new energy production.

Through review of research on soft skills and employability skills as well as industry consultations with businesses and education providers, the LVA has identified that the 'enterprise skills' of jobseekers and the current workforce are misaligned with the expectations of employers, both now and for the future workforce.

Enterprise skills are not technical; rather, these require behaviours, values and attitudes that support successful participation in the workforce and help to stimulate social and economic development. These skills are transferable across a range of industries and professions and apply to multiple roles and occupations.

The LVA has been seeking to establish its own micro-credentials in enterprise skills for workers and graduates from any level of education, who are in transition between jobs and who need skills not recognised specifically in mainstream credentials.

What is being assessed?

The first step in the process was to conduct detailed consultations with employers and other stakeholders in the community, to identify transferable skills considered to be most important for successful participation in the workforce. The enterprise skills being assessed in the Phase 1 LVA trial project include the following:

1. Enterprise Collaborative Problem Solving, defined as how people work together to solve problems in order to reach common goals.
2. Enterprise Communication, defined as how people deliver and receive information so that intended messages are understood.

Who is being assessed?

This micro-credentialing initiative is anticipated to appeal to several groups of potential candidates. These include, for instance:

- » senior secondary students undertaking enterprise skills or related subjects in local secondary schools
- » TAFE students
- » active jobseekers, including the unemployed and under-employed
- » employees wishing to obtain credentials for skills they currently possess, for further career development purposes (eg. applying for a promotion).

Stakeholders

The primary stakeholders of this initiative are local industries, businesses and education providers. Key stakeholders who have been involved in the Phase 1 trial include:

- » Energy Australia
- » Engie Australia
- » Gippsland Water
- » Latrobe Regional Hospital
- » Drouin and Traralgon Secondary Colleges
- » Berry Street
- » Interchange Gippsland

- » Australian Paper
- » Best Match Recruitment
- » TAFE Gippsland
- » Flavorite Hydroponics
- » Warragul Community House
- » ArcBlue Consulting
- » State Government, Victoria
- » Federation University Australia
- » Broadening Horizons Gippsland
- » Gippsland Tech School.

Standards referenced

The progressions to be used as part of the assessment framework were co-designed with various stakeholders and are unique to the Gippsland context. These progressions – to be mapped to the Australian Core Skills for Work (ACSF) framework – are designed to meet the needs of current and emergent growth industries in the region.

How is it being assessed?

The enterprise skills are assessed through a range of assessment methods, namely 360-degree surveys, online quizzes and an evidence portfolio. Each method provides opportunities for candidates to demonstrate their competence to practically apply those skills. The trialing of these methods and associated tools will enable the validity and reliability of the overall assessment to be ascertained.

Nature of the micro-credential

Candidates who successfully complete the micro-credentialing process will receive an Enterprise Skills Profile. This Profile will illustrate their level of competence in each enterprise skill, mapped against the ACSF.

The LVA will be the issuer of the micro-credential. The University of Melbourne, through its Assessment Research Centre (ARC), will calibrate and warrant the assessments, to ensure that these have currency and are fit for purpose.

04. Assessment of Leadership Competence, Saudi Arabia

The micro-credential is expected to be endorsed by employers in Gippsland, who will use the credential as an indicator of the potential, suitability and capability of job candidates. Some employers are also proposing to use the profile as part of their HR profiles for staff.

Technology support

The micro-credential trial candidates registered online via a webpage specifically created for the trial. The associated assessments were delivered through the ARC-RUBY assessment platform, enabling the candidates and their 360-degree raters to complete these online.

Micro-credential applications

The micro-credential being developed covers treatment of transferability across learning areas, domains, disciplines and contexts.

State of play

During 2020, trialing and development will continue, with a focus on strengthening the skills progressions, exploring other important transition skills and expanding the repertoire of assessment methods to include performance-based assessments. Implications for further consideration include issues of currency, comparability, moderation and cross-institution recognition.

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Organisation

Ministry of Education (MoE),
Kingdom of Saudi Arabia (KSA)

Aspiration

In 2018–19, the Ministry of Education (MoE) in the Kingdom of Saudi Arabia (KSA) embarked on an extensive educational reform program, called *Kefayat* (Competencies), to equip schools and teachers with the capabilities needed to change their pedagogical emphasis, improve educational outcomes and equip every student with the competencies they will need to realise KSA's Vision 2030 goals.

The MoE's overarching goal with *Kefayat* was to change learning from a focus on content-based, subject-oriented, knowledge accumulation to an emphasis on developing competencies suitable for a post-industrial, knowledge society. These competencies included, for example, collaboration, problem-solving, creativity and critical thinking.

Consultants from the University of Melbourne (UoM), including those affiliated with the Assessment Research Centre (ARC), were tasked with providing professional development support to educators at different levels of the education system. *Kefayat* involved four consecutive trainee intakes: Tier 0 Champions, Tier 1 Coordinators, Tier 2 School Teams, and Tier 3 Schools.

This case-study profile focuses on the Tier 0 Champions, who were developed and supported by the consultants to lead the implementation of competency-based education (CBE) in KSA. The Tier 0 Champions were each assessed so that individualised feedback could be provided on the development of their CBE leadership capabilities.

What was assessed?

This aspect of the *Kefayat* project assessed the capabilities of Tier 0 Champions to lead CBE implementation in KSA. The assessment focused on identification and recognition of leadership qualities unique to CBE, including knowledge of CBE principles, modelling of aligned pedagogical approaches and cooperative teamwork strategies. The ability to articulate knowledge, describe experiences and provide supporting evidence to support claims was an important element of the assessment requirements.

Who was assessed?

The Tier 0 Champions were selected from a diverse group of educators, including principals, supervisors and classroom teachers. They were selected on the basis of their standing within the profession, interest and engagement with CBE and their ability to communicate in English.

Stakeholders

The key stakeholders in this project included:

- » the MoE of KSA
- » educators at different levels of the education system in KSA
- » students involved by association in *Kefayat*, i.e., their teachers were participants in the program
- » parents and carers involved by association in *Kefayat*.

Standards referenced

A progression was designed by the UoM consultants, in collaboration with MoE *Kefayat* personnel, to enable formative assessment of Tier 0 Champions' CBE leadership competence. This Leading CBE progression comprises four levels, each of which clarifies the expected level of competence.

Progression for Leading CBE

Level 4:

At this level, participants evaluate their own practice in a transparent manner and model a culture of challenge. They focus on developing the capacity of their team members' CBE understanding and practice while empowering them to make decisions about program implementation.

Level 3:

At this level, participants can justify their pedagogical approach using CBE principles. They help their team members to reflect on performance through open-ended questioning and feedback. They organise their team to promote collaboration and make team members accountable.

Level 2:

At this level, participants communicate deep understanding of CBE and connect it to Vision 2030. They allocate leadership responsibilities, decision making and tasks to team members based on an individual's skill set. They draw on evidence of their learning and discuss practices to enable professional development of themselves and others.

Level 1:

At this level, participants have strong knowledge of CBE. They describe its principles and can explain challenges with its implementation in the KSA. They use evidence to set their own learning goals and to provide feedback on the performance of others.

How was it assessed?

The assessment was conducted via an interview with two UoM consultants. The interview was designed to elicit evidence from each Tier 0 Champion demonstrating their respective levels of competence in Leading CBE. The assessment process involved the following steps.

1. The 30-to-40-minute interview took the form of a discussion led by the Tier 0 Champion, with the consultants providing prompts as necessary to help the Champion identify his/her Zone of Actual Development (ZAD) on the Leading CBE progression, using evidence.
2. Following the interview, the consultants discussed and arrived at a consensus judgment of the Champion's competence against the Leading CBE progression.
3. A report was issued for each Champion indicating their level of competence on the Leading CBE progression.

Nature of the micro-credential

Each Tier 0 Champion who completed the interview cycle received the report as well as additional formative feedback suggesting next steps in developing CBE leadership competence.

Technology support

The ARC-RUBY platform was used to facilitate assessment and reporting of the Tier 0 Champions' CBE leadership competence. The platform generated a summary of leadership competence and a progress profile for each of the Champions as well as an amalgamated report on all program participants.

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05. Assessing and reporting learning progress of Students with Additional Learning Needs (SWANs)

Organisation

The SWANs assessment tools were developed through a partnership between the University of Melbourne and the Victorian Department of Education and Training (DET), supported by two Australian Research Council Linkage grants. Both parties continue to collaborate, to support use of the assessment instruments in Victorian schools.

ABLES (Abilities Based Learning and Education Support) and Levels A to D of Towards Victorian Curriculum for students with disabilities and additional needs were built in conjunction with the development of SWANs. ABLES links the SWANs assessments to the Victorian Curriculum and are mapped to Levels A to D of Towards Foundation. The ABLES tools also provide supplementary resources to support teachers (e.g. professional learning modules, ABLES experts). For Victorian government schools, the SWANs instruments are embedded within the ABLES resources.

Where requested, the DET has given permission for other parties to use the ABLES curriculum resources to support their use of the SWANs assessment instruments. In Western Australia and (forthcoming) in South Australia, the instruments are mapped to the state-based, or Australian Curriculum, following the ABLES model. When packaged with this mapping, the instruments are called ABLEWA or ABLESA. In each of these versions, the SWANs assessment tools are maintained with full integrity, with the University of Melbourne hosting the online assessment and reporting tools for schools nominated by the system as well as providing system-level reporting.

The following is a list of Australian education systems, in addition to DET in Victoria, that have adopted the suite of instruments or are considering them, for implementation in their jurisdictions:

- » Western Australian School Curriculum and Standards Authority (ABLES)
- » South Australian Department of Education and Child Development (ABLES)
- » ACT Education Directorate (ABLES)
- » Northern Territory Department of Education (ABLES)

- » Queensland Curriculum and Assessment Authority (evaluation in progress) (ABLES)
- » New South Wales Department of Education (evaluation of suitability for NSW government schools is in planning stages) (SWANs)

Additionally, individual schools across Australia and New Zealand have implemented the SWANs tools, in cases where system support is unavailable or not applicable.

Aspiration

The SWANs project aimed to provide a resource of assessment, reporting and instruction for teachers of students with additional learning needs. This was in response to teachers citing lack of knowledge, time and resources to teach such students.

Existing curricula typically begin at a level that students with additional learning needs may have not yet achieved. For instance, the Victorian Curriculum begins at Foundation Level, targeting expectations of a child developing typically at approximately five years of age. However, many students with additional learning needs are yet to attain this level of learning. The SWANs suite of tools aimed to expand the targeted levels by developing a resource that would describe levels not present in the mainstream curriculum. In this manner, teachers could describe what students with additional learning needs are able to do, rather than what they cannot.

As a basis for instruction, the SWANs project developed assessments based on a learning progression. The assessments aimed to describe students' levels of learning and provide information about what they needed to learn next in order to progress. An environmental scan of other assessment systems revealed that assessments designed for students with additional learning needs were typically diagnostic. Moreover, these assessments were targeted at clinical specialists, such as psychologists, rather than teachers and their teaching.

By contrast, the SWANs and ABLES suite of tools are intended for use by teachers to support their classroom practices.

The aim is to provide a system of assessment and reporting, supported by instructional assistance, focusing on the foundational skills required by students to learn and access the Australian Curriculum.

What is being assessed?

The SWANs project developed assessments in foundational skills. The assessments cover eight domains of learning, targeting skills considered essential for accessing the general curriculum. The domains are:

1. Early literacy skills – using symbols to make and interpret meaning
2. Functional communication skills
3. Social skills and emotional understanding
4. Learning skills – attention, memory, organisation and executive functioning
5. Early numeracy skills
6. Thinking skills – understanding, imagination and reflection
7. Digital literacy
8. Movement problem-solving.

Who is being assessed?

The SWANs assessment tools target school-aged students (five to 20 years), who exhibit learning difficulties in any one or more of the assessed skills, with or without a formal diagnosis. It is up to the teacher to make judgments about which assessments are relevant for use with a particular student.

Stakeholders

The primary stakeholders of SWANs and ABLES are:

- » students with additional learning needs
- » their parents and carers
- » therapists and other personnel who support the students in their learning and schooling aspirations.

Curriculum and standards referenced

The SWANs component of the project carried out in partnership with the Victorian DET developed the underlying assessments based on learning progressions in each of the eight domains of learning. This includes the learning progression as well as the instructional strategies mapped to each level of learning. The ABLES component took the learning progressions and mapped these to the Victorian Curriculum (Levels A to D). This work was carried out in conjunction with the development of Towards Foundation by the Victorian Curriculum and Assessment Authority.

How is it being assessed?

Each of the SWANs assessments were developed as part of a PhD research project. The assessments underwent rigorous theoretical review and a series of workshops with subject-matter experts to develop a hypothetical, criterion-referenced framework. This was the basis for developing a set of assessment rubrics. The rubrics were then written as items in an online multiple-choice questionnaire. Each item went through a large-scale field trial with at least 500 students assessed. Assessment data from the trial was used to develop empirically derived progressions. These progressions were compared with the hypothetical framework and reviewed again by a panel prior to finalisation.

The results of the trial demonstrated that the assessments are highly reliable (both separation reliability and internal consistency). The resulting assessments are administered online and reports are generated based on calibration results and determined cut scores for each level of learning. The cut scores were set based on the empirical estimations of item difficulty and judgments made by subject-matter experts about distinct, qualitative transitions in skill from one level to another.

Nature of reporting

Several reports can be generated based on the assessment data. These include a learning readiness report, a profile report, a class report and a school report. The reports are targeted for teacher use to inform instructional planning and the school report is useful for informing school-wide implementation of strategies.

The learning readiness report includes a nutshell statement as well as an extended statement of the level within which a student is working. The nutshell statement summarises the main theme or quality of the level. The extended statement provides further detail of the level within which a student is working. In ABLES, links to the curriculum and curriculum descriptions are included. In the final part of the report for both SWANs and ABLES, instructional strategies are provided that are matched to the level of learning, to help progress a student from that level to the next.

The profile report presents a picture of one student's achievement across the domains of learning and across different time periods. The class report presents student achievement in one domain of learning, across different time periods, for one class or group. The school report clarifies growth over two years in one domain of learning, for all students assessed in one school.

Technology support

Presently, SWANs is housed in the University of Melbourne's Assessment Research Centre Online Testing System (ARCOTS).

State of play

In 2020, the SWANs instruments will be migrated to a new platform with the intent of upgrading the suite's technological capabilities. Improvement work is ongoing with the SWANs and ABLES resources.

Through feedback from stakeholders and monitoring of the system, continual adjustments are being carried out to ensure that these resources remain user-friendly. In addition, ongoing validation work is being undertaken to check reliability and generalisability over time.

In addition, plans are being developed to extend the various uses of SWANs, while maintaining its integrity and focus on being a tool for teachers. For example, it is serving as a basis for developing high-quality developmental assessment tools, for students of all abilities, in areas of learning typically deemed hard to assess.

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06. Assessing and micro-credentialing employability skills

Organisation

Beenleigh State High School,
Queensland, Australia

Beenleigh is a co-educational, Years 7–12 government secondary school in Queensland, located around 30km south of Brisbane city. According to 2018 figures from *MySchool*, the school enrolled 1621 students (838 boys, 783 girls). Of these, 1237 were high-school students, as the school has a Centre for Continuing Secondary Education attached to it. Overall, there were 211 staff (133 teaching staff). The school has an ICSEA (Index of Community Socio-Educational Advantage) value of 935, with 1000 being the average.

Aspiration

Beenleigh is part of the University of Melbourne Network of Schools (UMNOS), a network of over 100 schools from across Australia. UMNOS provides an opportunity for Australian schools to collaborate with the University's researchers and other schools around a shared commitment to improving student learning using evidence-based practices. Notwithstanding, each UMNOS member school commits to a program of school improvement unique to its specific vision and context. In 2020, key UMNOS focus areas include: assessing, teaching and digital micro-credentialing of complex competencies and general capabilities, such as communication, critical and creative thinking, social and emotional learning, entrepreneurship and ethical understanding; mastering formative assessment, reporting and developmental learning progressions; pedagogy for student voice and agency; improving student outcomes in reading and writing; and improving student outcomes in Mathematics.

Through UMNOS, Beenleigh has been working with the ARC at the University of Melbourne to construct a bespoke approach to assessing and micro-credentialing the development of students' complex competencies, specifically those related to work-readiness. This initiative commenced after the school identified a need to assess and micro-credential the employability skills of its secondary school leavers.

Beenleigh commenced implementation of its employability skills micro-credential in 2019. The school had begun to introduce the micro-credential opportunity in 2018 but was unable to develop a suitable rubric for assessment. By the end of 2020, the school is aspiring towards a state-wide pilot of this credential. Such a pilot is expected to be influential in drawing attention to the importance of recognising competencies essential for success in life and work, beyond traditional academic achievements and certifications.

What is being assessed?

Beenleigh commenced by conducting detailed consultations with the school community and community stakeholders, to identify the kinds of transferable employability skills considered essential for successful participation in the workforce. The school used a number of publications in the development of the micro-credential, including the Australian Curriculum general capabilities, the OECD's *Future of Education and Skills 2030* and QCAA's *21st-century Skills and the Employability Framework*. The employability skills being assessed by Beenleigh include the following.

1. Initiative and creativity, defined as comprising two indicative behaviours that can be performed at four levels of increasing complexity: i) generates ideas; ii) takes action.
2. Problem-solving, defined as comprising two indicative behaviours that can be performed at four levels of increasing complexity: i) uses strategies; ii) reflects on solutions.
3. Collaboration and teamwork, defined as comprising two indicative behaviours that can be performed at four levels of increasing complexity: i) collaborates with team members; ii) negotiates with team members.
4. Self-management, defined as comprising four indicative behaviours that can be performed at four levels of increasing complexity: i) set goals; ii) perseveres; iii) regulates emotions; iv) acts ethically.

Each of the four levels of increasing complexity map to a level statement. Collectively, the level statements form a learning progression. Further, each level statement corresponds to the level of micro-credential to be awarded, namely, Bronze, Silver, Gold or Platinum. An extract from the assessment framework, for the Bronze and Silver levels, is provided on page 44 as an illustration.

Who is being assessed?

This micro-credentialing initiative is intended initially for Beenleigh students. The school intends to make this credential available to other students in Queensland.

Stakeholders

Other than Beenleigh students and staff, the primary stakeholders of this initiative are parents, employers (such as local industries and businesses), education authorities and other education providers.

Curriculum and standards referenced

The assessment framework was co-developed with stakeholders. Though it is unique to the Beenleigh context, the framework is expected to have a level of transferability to other contexts, given that it references the Australian Curriculum general capabilities (specifically Critical and Creative Thinking and Personal and Social Capability) and ARC's Collaborative Problem Solving progression and rubrics, used widely in Australia and internationally.

How is it being assessed?

Beenleigh's employability skills are assessed through teacher, self and peer observations, guided by the assessment framework. The progression in the framework is hypothesised and further empirical work is required to validate and refine this progression.

The school has trialed the hypothesised progressions over two rounds: in Round 1, 165 students from Years 10–12 were involved; in Round 2, 104 students were involved. Some moderate improvements to clarity and precision of wording were made to the progression after each round.

As the assessments are based on observations, fairness, dependability, trustworthiness, subjectivity and bias are potential issues. The use of multiple assessors and observations of performances from a range of contexts is in part intended to address some of these issues.

Nature of the micro-credential

Students who successfully complete the assessment process will receive an Employability Skills micro-credential (badge) at Bronze, Silver, Gold or Platinum level. This credential will indicate their overall level of competence in the employability skills specified earlier. Beenleigh will be the issuer of the micro-credential. The school is also implementing and issuing other credentials within their ecosystem. These include Semper Altiora Credentials – Semper

Altiora is the school motto – that recognise student achievement or participation in the areas of Leadership, Community Involvement and Extra-Curricular, as well as Specialist Activity and Industry Badges that recognise specific industry-based skills in which students develop competence.

Technology support

Assessments are completed manually at present, using printed assessment frameworks, with potential for using technology in the future to simplify and expedite assessment and reporting processes. Technology will aid also with the micro-credential’s transferability across contexts.

Micro-credential applications

The micro-credential is specific to Beenleigh, but the assessment framework is sufficiently transferable across learning areas, domains, disciplines and contexts. The school is also recognising both student attendance and achievement within the credential.

State of play

Over two rounds of trials and refinement, the micro-credential has demonstrated adequate rigour for internal use. For broader rollout and recognition, issues of warrantability will need to be addressed in partnership with assessment experts and relevant education authorities. These include further work around instrument design, validation, comparability, moderation and cross-institution endorsements and recognition.

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INITIATIVE & CREATIVITY		PROBLEM SOLVING		COLLABORATION & TEAMWORK		SELF MANAGEMENT		BEENLEIGH HIGH SCHOOL SEMPER ALTIORA		
1.1 Generates ideas	1.2 Takes action	2.1 Uses strategies	2.2 Reflects on solutions	3.1 Collaborates with team members	3.2 Negotiates with team members	4.1 Set Goals	4.2 Perseveres		4.3 Regulates emotions	4.4 Acts ethically
1.1.1 Applies existing ideas to a new situation	1.2.1 Participates in available activities	2.1.1 Develops practical solutions	2.2.1 Demonstrates flexibility when choosing solutions	3.1.1 Contributes to team outcomes	3.2.1 Identifies that there are diverse perspectives	4.1.1 Sets achievable goals	4.2.1 Follows steps towards prescribed outcome	4.3.1 Recognises the influence of emotions on behaviour, learning and relationships	4.4.1 Identifies ethical responsibilities	BRONZE The student adapts to new situations practically with teams to solve problems. They set goals and persevere to achieve them. They are considered in their responses.
1.1.2 Investigates known ideas to produce a new perspective	1.2.2 Works independently and is self-reliant	2.1.2 Applies strategies to solve problems	2.2.2 Explains thinking behind selected solution	3.1.2 Fulfills defined role as part of a team	3.2.2 Distinguishes diverse perspectives through team interactions	4.1.2 Matches goals to learning needs	4.2.2 Devises strategies/plans to co-ordinate the achievement of challenging tasks	4.3.2 Manages and moderates emotional responses when expressing opinion, beliefs, values, questions and choices	4.4.2 Identifies and acts on behaviours that exemplify ethical values	SILVER The student is able to work independently and applies a range of strategies to solve problems as part of a team with varied perspectives. They develop needs based goals and reflect on their actions emotionally and ethically.

07. Victorian Aspiring Principal Assessment (VAPA)

Organisation

Bastow Institute of Educational Leadership, Victoria, Australia

Aspiration

The Victorian Aspiring Principal Assessment (VAPA) is a competency-based assessment initiated to support the development of principals for schools in Victoria, Australia. The brief for the assessment specified the need for it to be inclusive, equitable and encouraging for aspirants. In addition, the assessment should be context free, accessible to aspirants possessing different types and levels of experience, as well as capture varying levels of capability so that any educator in any school in Victoria could undertake and benefit from it.

The Department of Education and Training Victoria (DET) aims to promote excellence in leadership in schools, recognising quality school leadership as a key factor in lifting student outcomes. Yet, prior to VAPA, no assessment for aspiring principals existed.

The purpose of VAPA is to determine the current competencies of aspiring principals and subsequently determine their developmental needs for principalship. The assessment framework aims to represent a sample of expected behaviours in the five professional practice areas specified by the Australian Professional Standard for Principals. Identification of these behaviours was a key challenge, given that the behaviours needed to satisfy the expectations of all stakeholders.

What is being assessed?

Project collaborators determined that VAPA would be limited to skills and knowledge, with a separate measure for emotional intelligence. The skills and knowledge derived from the Australian Professional Standard for Principals have been categorised into:

1. Leading Teaching and Learning
2. Developing Self and Others
3. Leading Improvement, Innovation and Change
4. Leading the Management of the School
5. Engaging and Working with the Community.

Who is being assessed?

VAPA is available to all educators in Victorian schools. As of February 2020, the assessment is optional; those who undertake the assessment receive a report and feedback but no formal credential.

Stakeholders

The key stakeholders who will benefit from VAPA include:

- » DET
- » Catholic Education Melbourne
- » Independent Schools Council of Australia
- » Aspiring principals.

Standards referenced

The VAPA framework is referenced against the Australian Professional Standard for Principals. It was developed in collaboration with relevant stakeholders, including members from:

- » DET
- » Catholic Education Melbourne
- » Australian Institute for Teaching and School Leadership (AITSL)
- » Experienced principals, both current and retired
- » Australian Education Union (AEU)
- » Australian Principals Federation (APF)
- » Department of Education and Training, Australian Government
- » Principals' Association of Specialist Schools (PASS)
- » Victorian Aspirant Principal Assessment (VAPA) Process
- » Victorian Association of State Secondary Principals (VASSP)
- » Victorian Principals Association (VPA).

How is it being assessed?

The assessment uses a range of methods to collect evidence to be evaluated against the VAPA Framework. The methods are a 360-degree Assessment, a Self-Assessment, a Portfolio and an Interview. The VAPA Framework comprises performance indicators and criteria describing levels of quality or complexity for each indicator.

Each assessment method assesses a selection of performance indicators. A lead assessor uses all the evidence collected to make an overall judgment on the aspiring principal's capability against the VAPA Framework.

The 360-degree Assessment gathers evidence of how well an aspiring principal typically applies their leadership knowledge and skills in their daily work, from the perspectives of those who work closely with them. The Portfolio is an opportunity for an aspiring principal to provide artefacts of their practice. The Interview provides an opportunity for assessors to clarify information from the 360-degree Assessment and the Portfolio.

Nature of the micro-credential and applications

VAPA has been designed to support potential credit transfer for nationally recognised qualifications within the Australian Qualifications Framework (AQF) and the establishment of related micro-credentials, if Bastow chooses to do so.

Technology support

Bastow currently collects data for VAPA through a customised online portal.

State of play

Bastow, in partnership with the Assessment Research Centre (ARC), has run a pilot and trial of VAPA. It is currently undergoing further consultations to obtain face validity with stakeholders. A plan is underway to undertake a validation study of VAPA that includes predictive validity.

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Appendix 02



Sample
progressions



01. ARC's five-strand empirical progression for Collaborative Problem-Solving with six levels of attainment

Level	Social			Cognitive	
	Participation	Perspective Taking	Social Regulation	Task Regulation	Knowledge Building
F		The student can tailor communication with their partner based on their awareness of their partner's understanding and are easily understood from the start of the task. The student incorporates the contributions from their partner to suggest new solution paths or modify incorrect ones. They use solutions provided by their partner and work more collaboratively through the problem-solving process.	The student assumes group responsibility for the success of the task. They can manage conflicts with their partner successfully, resolving differences before proceeding on a possible solution path. The student is able to evaluate their overall performance in the task. They are also able to evaluate the strengths and/or weaknesses of their partner based on their performance during the task.	The student's approach to the task is systematic and they work very efficiently, successfully completing complex tasks in an optimal amount of time and attempts. They work with their partner to identify the relevant resources and disregard those that posed no benefit in previous attempts.	The student has a good understanding of the problem from the beginning and can reorganise the problem in an attempt to find a new solution path.
E	The student is able to actively participate in unfamiliar tasks. The student initiates and promotes interaction with their partner often before entering their own answer.	The student acknowledges and responds to contributions from their partner but does not make changes to their original plan.	The student attempts to resolve differences in understanding with their partner but resolution of differences are not reached. The student is able to comment on their partner's performance during the task.	The student's engagement in the task appears to be well thought out and planned and each action appears purposeful. The student plans goals based on knowledge and experience from previous goal outcomes and subtask completion. They note information that may be useful in future tasks or for an alternative solution path.	The student can identify several consequences of their actions. The student can modify and adapt their original hypotheses, in light of new information, testing alternatives hypotheses and altering their course of thinking.
D	The student perseveres to solve the task by repeating attempts and/or applying multiple strategies.	The student modifies communication with their partner to improve common understanding and share resources and information.	The student comments on or shares information with their partner regarding their own performance while attempting the task. The student is aware of their partner's performance on the task.	The student adopts strategic sequential trials and increasing systematic exploration. They narrow their goal setting and focus on successfully completing a subtask before moving on. The student simplifies the problem, analysing it in stages and plans strategies with their partner.	The student can identify connections and patterns between multiple pieces of information. The student can successfully complete subtasks and simpler tasks.
C	The student demonstrates effort towards solving the problem. The student discusses the task with their partner by responding to communication cues and requests.	The student makes contributions to their partner's understanding.	They have a common understanding with their partner in regard to the problem. The student reports to their partner regarding their own activities on the task.	The student becomes aware of the need for more information pertaining to the task and begins to gather as much information as possible. The student realises that they may not have all the required resources and allocate their own resources to their partner.	The student begins to connect pieces of information together.
B	The student actively participates in the task when it is familiar. Interaction between partners occurs more frequently but is limited to only when it is necessary for completing the task.	The student is not overtly responsive to their partner, often taking a long time to respond or not at all and tends to ignore their partner's contributions.	The student still works largely independently, taking responsibility for their own actions during the task. The student is aware of their own level of performance during the task.	The student limits their analysis of the problem by only using the resources and information they have. They make good use of their own resources. The student will remain limited in their goal setting with broad goals such as task completion.	The student tests their hypotheses based on the information they have and they can identify basic consequences of their actions.
A	The student commences the task independently, focusing only on the instructions provided. Interaction with their partner is limited to the beginning of a task and only in those situations where the instructions are clear.			The student attempts to solve the problem through a random guessing approach and tends to repeat previous mistakes or trial the same approach multiple times with no clear indication of advancing through the task. However, if the student has difficulty understanding the task they make very little attempt to explore the problem at all.	The student continually attempts the task with the same approach with little evidence of understanding the consequences of actions taken. The student focuses on each piece of information individually, only following the specific instructions provided.

02. Progression for Reading Development (ARCOTS)⁴¹

Level A

Focus on print conveying meaning

Students understand that language can be represented by symbols and that text conveys meaning. Their print knowledge includes holding a text the right way, reading directionality and page-turning. They can identify the sound/symbol correspondence of letters and some common blends. To gain meaning from printed words, they may refer to accompanying pictures, focus on the initial letter, or draw on prior knowledge. In spoken words, they can identify the initial sounds and can discriminate minor vowel and consonant differences.



Level B

Focus on cracking the code

Students can determine the meaning of texts with the help of repetition, illustrations and knowledge of familiar topics. They can recall content using picture cues for support. They can understand print conventions such as word spacing and punctuation marks. They can read familiar words with regular blends or spelling patterns and may focus on the initial and final sounds in unfamiliar words. In spoken words, they can identify discrete sounds, discriminate between syllables and recognise rhyme.



Level C

Focus on story

Students can identify the narrator of a simple story, describe what the story is about and relate it to their own experience. They can locate information by matching words and can re-tell a story using illustrations in sequence as a guide. They understand the implications of visual layout (e.g. in posters, advertisements or party invitations) for the meaning of texts. Their understanding of text is supported by high-frequency sightwords and simple sentence structure. When they cannot easily recognise a word by one or two letters they may draw on prior knowledge, sentence structure or accompanying illustrations. They use simple punctuation to assist fluency and re-read to correct their own errors.

Level D

Focus on finding information

Students can recognise written words relatively effortlessly. They also recognise basic narrative conventions, e.g. dialogue and can link the elements of a story. They can identify a main character's feelings from explicitly stated actions. They can read back and forward to locate information and understand that similar meanings can be conveyed by different words. They attempt unfamiliar words by sounding out, re-reading and looking through all word parts. In spoken words they are able to manipulate the sounds within words by segmenting and reconstructing the different sounds.



Level E

Focus on selecting and combining strategies

Students make meaning by combining syntax, vocabulary and context. They can identify the main ideas in a text, select information and make predictions based on their understanding of ideas, events and characters. They can also gain understanding of a text by connecting it to their own experience or general knowledge and are able to suggest reasons for a character's actions or feelings by connecting explicit information with personal experience.



Level F

Focus on interconnections

Students can sequence information according to a story's timeline and are aware of causal relationships in a connected narrative. They are able to make assumptions based on general knowledge and cues in a text. They can use a wider context (e.g. the general meaning of a sentence or paragraph, or a word's position in a sentence) as a cue to interpret a word or a phrase. They can visualise locations from descriptions.

Level G

Focus on synthesis

Students can synthesise information across a text to determine its overall purpose or draw a conclusion. They understand that words and texts can have non-literal meanings and they can determine the moral of a fable. They can interpret the style and language used to identify different types of text and recognise that similar content can be expressed in different ways. They can also synthesise elements of a story to form an opinion about a character.



Level H

Focus on evidence for alternatives

Students combine overall understanding with an attention to detail that enables them to focus on subtleties and consider alternative implications of words and texts. They can identify words and phrases that support different sides of an argument and make use of formal definitions and technical language to consider alternative meanings. They are able to hold in mind detailed information from different parts of a text while weighing up evidence. They can identify different levels of meaning in a text.



Level I

Focus on author's purpose

Students can infer an author's intention from what is explicit or implicit in a text. They can identify the most likely character or plot developments and the most likely explanations of behaviour or events. They understand how structure influences interpretation and can analyse how authors use text structures and language features to achieve a purpose. They can gain meaning from complex clauses and use their understanding of phrases and clauses in a text to analyse their relevance. They understand how a word's meaning changes when it is used in different contexts. They can combine indirectly stated information and writing style to draw conclusions about the roles of characters and events in a narrative.

Level J

Focus on distinguishing the conventional and the unconventional

Students demonstrate an awareness of social and narrative conventions and a capacity to accommodate the unexpected or unconventional, both in form and in content. They are able to comprehend perspectives, experiences and uses of language that do not conform to predictable patterns. They can offer reasons for the use of different writing styles.

They can connect parts of speech not presented in the usual order, analyse detailed text to discover embedded rules or patterns and identify inconsistencies. They demonstrate understanding of the conventions of rational argument and the social norms of conversation as presented in dialogue. They can engage with imaginative writing that departs from conventional narrative to explore the fantastic and the irrational. They can identify an author's attitudes or beliefs and gain understanding of a character's viewpoint from a range of authorial choices (e.g. writing style, setting of scene, vocabulary).



Level K

Focus on indeterminate meaning

Students are able to combine knowledge of writing conventions with general knowledge to draw probable inferences when no conclusive evidence is provided in a text. They can identify unsubstantiated claims or arguments that are masked by rhetorical devices. They can postulate likely explanations of character behaviour when motivations are not explicitly stated.

They demonstrate understanding of the difference between empirical evidence and theory, supposition or anecdote. They can follow complex arguments or detailed instructions while accommodating ambiguity and incompleteness. They draw on personal experience and imagination in their interpretation of texts by taking different perspectives to achieve understanding. They can understand unusual, nuanced or creative language in fiction and technical terminology or jargon in non fiction. They are able to imagine and speculate about underlying reasons for choices of subject matter and style that may be problematic or indeterminate.

Level L

Focus on critical review

Students can identify an untrustworthy or unreliable narrator, understand an author's purpose in presenting conflicting information to the reader, and detect false statements or misleading reasoning. When reading persuasive or argumentative text they can distinguish necessary from sufficient conditions and are able to follow logical arguments and identify the absence of a sound basis for a conclusion. They can evaluate the relevance of information in a text to determine the strength of a main message or hypothesis. They can analyse and synthesise information from a range of different texts.



Level M

Focus on perspectives

Students approach text with an openness that allows them to personalise personal experience when considering different perspectives. They can interpret complex thought processes behind a character's point of view and take into account ethical or moral problems that may influence a character's perceptions or actions.

They allow for the influences of unfamiliar social contexts and the views and values of the time and place in which a text is written or set. They recognise that different interpretations of a text may be embedded in transcriptions to different media, e.g. from novel to film. Their understanding can encompass the deliberate use by an author of words with double or multiple meanings, including meanings that are opposite or inconsistent.

References

- The research literature in this area typically references a range of psychological traits. For instance, it is common in the discourse to study inherent psychological dispositions, like curiosity, kindness, empathy and carefulness, or learning styles. These dispositions are not the focus of curriculum policy or practice and are not usually the subject of direct teaching. Thus, consideration of these is not included here.
- See Patrick Griffin and Esther Care, eds., *Assessment and Teaching of 21st-century Skills: Methods and Approach* (Dordrecht: Springer, 2015).
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- Sandra K. Milligan, Gregor E. Kennedy and David Israel, *Assessment, Credentialing and Recognition in the Digital Era: Recent Developments in a Fertile Field*, Centre for Strategic Education Seminar Series 272 (East Melbourne: Centre for Strategic Education, 2018).
- A consequence of adopting a focus on assessment in this paper is that the deep changes to pedagogy and learning or school organisation may appear at times de-emphasised. Further details can be obtained by contacting the organisations listed in Appendix 1.
- Organisation for Economic Co-operation and Development [OECD], *The Future of Education and Skills: Education 2030* (Paris: OECD, 2018), [https://www.oecd.org/education/2030/E2030%20Position%20Paper%20\(05.04.2018\).pdf](https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf).
- For more information about the General Capabilities in the Australian Curriculum, visit <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities>.
- Australian Curriculum, Assessment and Reporting Authority, "General Capabilities," Australian Curriculum. Accessed February 1, 2020. <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities>.
- Bill Lucas, *Why We Need to Stop Talking about Twenty-First Century Skills*, Centre for Strategic Education Seminar Series 283 (East Melbourne: Centre for Strategic Education, 2019).
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- This is the formulation adopted by the OECD in its discussion of competencies, which are synonymous with capabilities in this paper.
- See Griffin and Care, *Assessment and Teaching of 21st-century Skills*; OECD, Education 2030.
- For more information about the Intercultural Understanding General Capability in the Australian Curriculum, visit <https://australiancurriculum.edu.au/f-10-curriculum/general-capabilities/intercultural-understanding>.
- Translated from John Erpenbeck and Volker Heyse, *Die Kompetenzbiographie – Strategien der Kompetenzentwicklung durch selbstorganisiertes Lernen und multimediale Kommunikation* (Münster: Waxmann, 1999, 162. Translation found in Ulf-Daniel Ehlers. 2006. "Making the Difference in E-Learning: Towards Competence Development and E-Irritation." In Selected Papers from the 4th EDEN Research Workshop, Castelldefels, Spain, 2006, eds. Ulrich Bernath and Albert Sangrà, 160.
- Read more about the General Capabilities in the Australian Curriculum at <https://www.australiancurriculum.edu.au/f-10-curriculum/general-capabilities>.
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- David N. Perkins and Gavriel Salomon, "Transfer of Learning," in *International Encyclopedia of Education*, 2nd ed., eds. T. Neville Postlethwaite and Torsten Husen (Oxford: Pergamon; New York: Elsevier Science, 1994), 12.
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- The Assessment Research Centre (ARC), at the University of Melbourne, has developed a course titled 'Measurement Analytics', offered as part of the Master of Applied Analytics program.
- See Claire Scoular, *Equipping Teachers with Tools to Assess and Teach General Capabilities*, Research Conference 2018 (Camberwell: Australian Council for Educational Research, 2018), https://research.acer.edu.au/research_conference/RC2018/13august/10.
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- Recent criticisms of various credentials in Australia can be explained by the shortfall against this standard. For instance, even though the ATAR is a very precise number (ranking), it provides little insight into what a student actually knows and can do, aside from providing an unspecified indication of scholastic capacity in one or more areas. Some professional courses are similarly criticised because these focus on assessing knowledge mastered rather than competence attained, or use time spent as a proxy for competence. Or, it may be that what is valued by the course is not aligned with what is valued by external stakeholders. Yet, some credentials are untrusted, because it is thought that people without the necessary skills and knowhow can still pass, or that gaming or cheating is possible, which casts doubt on the credential's integrity.
- The first three examples are from ARC work or collaborations. The final example is one of the MTC Mastery Transcript™, by the Mastery Transcript Consortium™, available at <https://mastery.org/a-new-model>.
- See Scoular, *General Capabilities*.
- Examples of organisations working to improve practice include the Centre for Assessment Reform and Innovation at the Australian Council for Educational Research (ACER) (<https://www.acer.org/au/cari/articles>) and the Boston-based Centre for Curriculum Redesign (CCR) (<https://curriculumredesign.org>).

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38. This review was completed by a review panel, chaired by Professor Peter Noonan. The final report from this review can be found at https://docs.edu.govcms.gov.au/system/files/doc/other/aqf_review_2019_0.pdf.
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41. See Griffin, *Assessment for Teaching*.



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