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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

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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 tasks[2], how to assess literacy and numeracy skills in classrooms[3] and how to assess the range of foundational learning skills that students with additional needs require to participate fully in typical classrooms[4]. 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 outcomes[5].

More recently, the ARC has extended this research[6] 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[7], illustrates some of the practicalities and comments on some of the implications for policy and practice that are emerging.

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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.