



FUTURE FRONTIERS ANALYTICAL REPORT



Key Skills for the 21st Century: an evidence-based review

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CIRES

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ABOUT CIRES

The Centre for International Research on Education Systems, located at Victoria University, conducts strategic research that identifies how well education systems work, for whom, and how they can be improved to work well for all. The Centre undertakes large-scale survey and policy-related projects covering every state and territory in Australia and every sector of education and training. It also undertakes international comparative research examining the features and performance of education systems around the world.



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EDUCATION: FUTURE FRONTIERS is an initiative of the NSW Department of Education exploring the implications of developments in AI and automation for education. As part of this initiative, the Department has commissioned background reports on future skills needs. The views expressed are solely those of the authors.

Executive Summary

Recent analysis examining trends in technology, the economy and the labour force shows that the world of work is changing. Based on an analysis of trends in the work of Australians each year, a new study has predicted that ‘as technology reduces the need for workers to complete routine, manual tasks they will spend more time focusing on people, solving more strategic problems and thinking creatively’ (FYA, 2017). This has led some to the view that as well as deep and broad knowledge in key disciplines, students will need a range of skills and capabilities, including creative and critical thinking and problem solving, in order to thrive in the future world. But, what are the skills future generations will need? Have they found their way yet into teaching and learning in schools? How can we make sure that schools are able to teach and transmit them?

This report considers the implications of these crucial questions for Australia, and it does so recognising that while there is a lot of discussion around the topic of key skills for the 21st century, there is little agreement yet about what the skills actually are, let alone whether they can be taught, measured or assessed. The reflections in this report, therefore, are somewhat speculative and need to be viewed as adding to the ongoing discussion around the skills our education system needs to consider in building courses and curricula for better preparing young people for their future lives. Its aims are modest: to bring together some of the current thinking around this topic and also to consider some of the work on the teaching and assessment of the skills future generations will need.

Key points

What are the key skills?

There is general agreement that schools need to be more than ‘ATAR factories’. In other words, school systems are expected to do more for students than just focus on preparing them for academic tests and improving their test scores. From a holistic point of view, schooling should be helping to equip young people with the tools they need to become engaged thinkers, resilient and resourceful learners, creative problem solvers and active members of their communities.

A wide range of skills and related dispositions are regularly considered as vital for schooling in the 21st century, including thinking skills, social and emotional skills, and attitudinal skills such as motivation and self-efficacy. The relevant skills form a dense conceptual web, that is, the constructs are related in complex ways and sometimes overlap one another. It is difficult to establish a clear distinction between knowledge, skills and dispositions based on student behaviours. Accordingly, various theoretical frameworks attempt to make sense of this complexity.

While identifying the skills considered most important is challenging, the following have in particular received close and concerted attention from policy makers, researchers and practitioners:

- critical thinking
- creativity
- metacognition
- problem solving
- collaboration
- motivation
- self-efficacy
- conscientiousness, and
- grit or perseverance.

This list, while neither exhaustive nor unassailable, is the product of a careful review of educational literature and research, as well as Australian and international frameworks for learning. These skills and related constructs include those most frequently found in different frameworks and related 21st century skills discussions. All of these skills can be learned and developed, although the extent to which their development can be induced in a school context varies. Evidence suggests that most of these skills and dispositions can be transferred across contexts, although they are better considered as partly context- or content-dependent rather than purely generic. For example, being skilled in creative and critical thinking in mathematics may not translate into creative and critical thinking in English. Some of the skills are correlated with academic achievement, though it is important to note that there is limited understanding of the causal mechanisms at play.

Teaching key skills for the 21st century

A number of jurisdictions across the world have selected different skills and attributes and established them as learning outcomes for students in primary and secondary schools. Jurisdictions have deployed system-level approaches seeking to improve the acquisition of key skills through improved teaching and learning. Several education jurisdictions are presented in this report, showcasing a range of implementation models, with consideration of successes and challenges. Most, if not all, of these jurisdictions have developed learning frameworks that are consistent with the national goals for schooling articulated by Australian Education Ministers, which call for schooling to support the development of broader skills in areas such as social interaction, cross-disciplinary thinking and the use of digital media, as well as in areas such as citizenship and contribution to community (*Melbourne Declaration on Educational Goals for Young Australians*, MCEETYA, 2008, p. 5).

Jurisdictions have typically articulated their commitment to improving key skills for the 21st century by defining broad goals of learning and establishing a list of interconnected skills needed to promote these learning outcomes. As an example, Alberta has placed the notion of a 21st Century Learner as a central fulcrum for its curriculum design. It has established three broad goals of learning, with schooling geared towards ensuring young people are given opportunities to become (1) engaged thinkers, (2) ethical citizens and (3) entrepreneurial. As well as literacy and numeracy skills, critical thinking, problem solving, decision making, creativity and innovation, communication, self-management, social responsibility and digital fluency are the interconnected skills viewed as critical to promoting the Albertan 21st Century Learner.

While most systems have been active in developing learning frameworks and looking at ways to incorporate skills into their curricula, and while some jurisdictions have invested in teacher training and professional development to promote these key skills, there is limited evidence to date of a widespread and successful transformation of classroom practice and assessment. Most systems recognise that the key skills need to be developed through teaching disciplines and subject content, as well as potentially *across* subject areas; yet no school system can yet demonstrate a generalised and consistent focus on key skills across schools, subjects and year levels.

Effective reform is likely to involve approaches that consider teaching standards, assessment, curriculum and instruction, professional development and learning environments. It is the interrelated impact of these facets of education that can foster the conditions for more systematic learning of key skills. Successful policy implementation needs to be accompanied by strategic investment in building the capacity of all teachers, across school and classroom contexts.

Measuring and assessing skills

A critical hurdle for many school systems in developing and implementing key skills is establishing valid and reliable measures and assessment tools. While

there has been significant attention paid to the development of frameworks and typologies of skills, much less attention has been given to their measurement and evaluation.

The three main ways of assessing student skills are: (1) student surveys (to obtain self-reported estimates of skill levels); (2) direct assessment using tests similar to those used for literacy and numeracy; and (3) teacher judgements (or reporting) on skill levels. All three have their strengths and limitations.

The suitability of an assessment method depends on the type of skill being assessed. The skills that are sometimes referred to as traits or 'soft skills' (e.g. grit, self-efficacy, conscientiousness or communication), are difficult to measure using direct assessment, and measurement tends to rely on self-reporting (generally based on psychological survey inventories). Direct assessment is more easily applied where the skills are closer to those traditionally recognised as 'cognitive' and where tests have historically been used.

Purpose is another critical aspect to consider when choosing a method of assessment. There are four primary assessment purposes in school systems: (1) monitoring student learning and progress (individually and collectively), (2) supporting instructional improvement, (3) monitoring system performance, and (4) setting priorities by signalling to teachers and parents which competencies are valued. A given assessment purpose can be better served by some assessment methods than others: for instance, teacher judgement can be particularly beneficial to instructional improvement, as it is direct and immediate, and many systems currently favour student self-report when considering broader skills, as it provides brevity at a relatively low-cost.

A judicious combination of various assessment methods, based on scores as well as qualitative assessment and determined by the assessment purpose(s) and the skill(s) being assessed, appears likely to improve the assessment of key skills and their acquisition by students. Assessment of key skills for the purpose of monitoring system performance

would require careful attention to the strengths and limitations of each assessment method.

Further work

The review undertaken for this report has confirmed, among other things, that many systems and schools have invested considerable effort in broadening their conceptualisation of the skills young people require for their future. At the same time, there is little evidence providing clear direction on the most effective approaches to the teaching and learning of the identified skills, as well as the best ways to assess them. It also remains uncertain whether these policy designs are reinforced with appropriate support provided to teachers and schools to meet the expectations placed upon them. While examples of successful practice exist in the research literature, school systems are still working to provide a coherent approach to embedding key skills across the various stages of schooling, and to evaluate more systematically how the emphasis on key skills impacts on the work of teachers, schools, as well as on student learning and outcomes.

