Learning assessments: Designing the future

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Professor Masters has served on a range of bodies, including terms as President of the Australian College of Educators; founding President of the Asia-Pacific Educational Research Association; member of the Business Council of Australia's Education, Skills and Innovation Taskforce; member of the Australian National Commission for UNESCO; and member of the International Baccalaureate Research Committee. He is currently a member of the Advisory Board for the Science of Learning Research Centre and the national Board of Life Education Australia.

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Abstract

Processes for assessing student learning are undergoing fundamental transformation.

This presentation will consider three developments which can be expected to shape how student learning is assessed in the future. First is fundamental change in how assessment is conceptualised and approached, with a focus on monitoring learning. Second is growing interest in the assessment of a broader range of skills and attributes than those addressed in most current assessment efforts. Third is advances in technology which are opening the door to new ways of gathering information about student learning, including through records of real-time interactions in online learning environments. In ACER's Centre for Assessment Reform and Innovation, these three developments are referred to as 'new thinking', 'new metrics' and 'new technologies'. This presentation will explore ways in which these three developments, together with scientific advances in our understanding of learning itself, can be expected to transform school assessment processes over the next decade.

Processes for assessing student learning are undergoing fundamental transformation.

Michael Barber and Peter Hill in their recent paper write of a coming 'renaissance' in educational assessment. Many of the forces for change that Barber and Hill identify are also described in my 2013 paper 'Reforming Educational Assessment: Imperatives, Principles and Challenges'.

So what are these forces for change, and how will they shape the future of assessment?

Three developments underpin the transformation now underway. First, fundamental changes are occurring in how we conceptualise and approach the assessment of student learning. Second, there is growing international interest in, and demand for, the assessment of a broader range of skills and attributes than those addressed in most current assessment efforts. Third, advances in technology are opening the door to new ways of gathering information about student learning, including through records of real-time interactions in online learning environments.

In ACER's Centre for Assessment Reform and Innovation we refer to these three developments as new thinking, new metrics and new technologies of assessment.

New thinking

In the past, assessment results in education have been used largely to judge and grade. This use of assessment is consistent with the view that the role of teachers is to teach, the role of students is to learn, and the role of assessment is to establish how well students have learnt what they have been taught — and to grade them accordingly. When used in this way, learning assessments are often viewed as straightforward and unproblematic.

It has become common to refer to the multiple 'purposes' of assessment. But in designing learning assessments for the future, a conceptual breakthrough is made by recognising that there is only one fundamental purpose of assessment in education. That purpose is *to establish and understand where learners are in an aspect of their learning at the time of assessment*.

The question of where learners are in their learning can be addressed for individuals and also for groups. It can be addressed at different levels of precision and in varying degrees of diagnostic detail. It is an essential question for classroom teachers, but is also crucial for education policymakers and system managers.

Information about where students are in their learning is necessary for identifying appropriate starting points for action. Teachers require information about starting points to target teaching on individuals' levels of readiness and learning needs and to set appropriate stretch goals for further learning. But decision-makers at all levels — from students and parents to school leaders to system managers and governments — require dependable information about current levels of achievement to guide future action.

Information about where students are in their learning also is essential for monitoring learning progress over time. Success in learning is best defined and measured as the progress (or growth) that students make. Information about progress is required to evaluate the effectiveness of teaching strategies, but is equally crucial for evaluating initiatives to raise national achievement levels and close achievement gaps.

Under this way of thinking, the focus of assessment is on understanding the current situation and then using this understanding to guide future action, monitor progress, and evaluate the effectiveness of interventions. It has much in common with the use of assessment in other professions such as medicine and psychology, where the purpose is not so much to judge as to *understand*.

New metrics

Around the world, school curricula are giving greater emphasis to skills and attributes believed to be important for life and work in modern society. These skills and attributes — sometimes referred to as general capabilities, cross-curricular skills or 21st-century skills — include literacy and numeracy, problem-solving, oral communication, critical and creative thinking, the ability to work in teams, self-management and intercultural understanding. The growing use of new digital tools is requiring new capabilities in information and communications technologies, including new skills in reading, communicating, online searching and problem-solving.

Greater priority also is being given to students' deep understandings of school subjects and their ability to apply those understandings to practical, real-world problems. This is sometimes referred to as a 'literacy' perspective. For example, 'scientific literacy' is defined as the ability to apply scientific knowledge and an understanding of scientific concepts and principles to everyday situations and problems.

These developments introduce a number of assessment challenges. First, considerable work is required to clarify newly-prioritised aspects of learning such as creative thinking and collaborative problem-solving. Can skills and attributes of these kinds be treated as general competencies or do they have meaning only in the context of specific school subjects? Related questions arise about the focus of assessment. For example, should an assessment of 'teamwork' focus on how well an individual works in and contributes to a team, or focus on the work of the entire team?

Second, constructs of these kinds usually require assessment methods very different from those used to assess mastery of curriculum content. Many require direct observations of learners' performances in complex situations, possibly working collaboratively to solve real problems, to apply what they have learnt, think critically, create new solutions, communicate with others, and make effective use of technology.

Third, because general capabilities such as critical thinking, self-management and intercultural understanding develop throughout the years of school, assessment processes must be capable of monitoring students' long-term development. The same is true of deep understandings of concepts and principles, which often develop only over extended periods of time. The implications are that assessment processes must be underpinned by pictures of what long-term improvements in these skills, attributes and understandings look like — that is, by learning 'metrics' for monitoring progress across multiple years of school.

New technologies

Advances in technology have the potential to transform assessment practice through more personalised, more interactive and more intelligent forms of evidence gathering, as well as by providing more immediate, high-quality feedback to learning processes.

Technology is providing enhanced learning and assessment environments. For example, in school science classes, students are manipulating variables such as forces, angles, distances and time and observing the effects of these changes in virtual environments that are sometimes difficult or impossible to create in normal classrooms. They are conducting on-screen experiments and recording and analysing their observations and measurements electronically. Such technologically enhanced environments provide unique opportunities to collect evidence about students' knowledge and understandings, including by tracking the processes they follow in attempting to solve problems.

Technology also is enabling more personalised forms of assessment in which tasks are matched automatically to the real-time performances of individual students. By selecting tasks at an appropriate level of difficulty, 'computer-adaptive' assessments of this kind provide more relevant assessment experiences and superior information about where individuals are in their learning. Students also can be given greater control over assessment processes; for example, by choosing where and when they wish to be assessed.

Finally, it is possible to build into digital assessments expert knowledge about common student errors and misunderstandings and to use this knowledge to automate diagnosis and guidance. For example, if a student when prompted to add the fractions $^{2}/_{3}$ and $^{1}/_{4}$, gives the answer $^{3}/_{7}$, an automatic hypothesis could be generated about the process the student followed. This hypothesis could be tested by assigning other fractions addition tasks. The results of such exploration could be flagged for the teacher's attention and/or lead to electronic tutoring in adding fractions.

A professional challenge

These developments, together with scientific advances in our understanding of learning itself, can be expected to transform school assessment processes over the next decade.

References

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