

# **QEPR - Review of Progress**

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*Review of progress towards implementing the government response to  
the Queensland Education Performance Review and related state  
school initiatives in literacy, numeracy and science*

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## Introduction

The following review was undertaken at the request of the Director-General of the Queensland Department of Education and Training<sup>1</sup>.

The purpose of the requested review was to ‘review progress and make recommendations to the Director-General, Department of Education and Training about initiatives aimed at improving the performance of Queensland students in literacy, numeracy and science’. More specifically, the Terms of Reference for the review requested an analysis and recommendations relating to:

- the effectiveness of the initiatives implemented in the Government response to the five recommendations of the Queensland Education Performance Review (QEPR); and
- the effectiveness of identified key initiatives in Queensland state primary schools to improve performance in literacy, numeracy and science.

The review was asked to make reference to the relationship between the initiatives and the *Highly Effective Practices for Continuous Improvement in School Learning* (Table 1.1 of QEPR Report) and to consult with Queensland education system stakeholders and undertake site visits if required to support the review’s findings or recommendations.

This report is based on a review of provided documentation and of other easily accessible online documents. The report incorporates suggestions made by the Department on a preliminary report delivered in early June. At that time it was agreed that site visits would not be undertaken for the preparation of this report, but might be useful at a later date.

Attention is drawn to the following:

- The Australian Council for Educational Research has submitted a bid to undertake work for the *Pre-Registration Test for Aspiring Primary Teachers*. The comments and recommendations made in the following report do not relate to ACER’s bid. They are equally valid regardless of the agency that is responsible for test development and administration.
- Reference is made in the report to three tests developed by ACER: the *Graduate Australian Medical School Admissions Test*, the *Undergraduate Medical and Health Sciences Admission Test* and the *Progressive Achievement Tests in Science*. These tests are referred to in this report only as examples of tests and test development and administration processes. The test development and administration processes they illustrate could be implemented by a range of agencies.

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<sup>1</sup> letter to explore possibility of undertaking review dated 1 April 2010

QEPR Recommendation	Government Response	Comment
1	'supported'	<p>Very good progress has been made in establishing the legislative framework for the <i>Pre-Registration Test for Aspiring Primary Teachers</i> and by the Queensland College of Teachers in the collaborative development of content parameters for the test and in advancing arrangements for test development and administration.</p> <p>It is <u>recommended</u> that the test specifications be more tightly focused on teachers' knowledge <i>of</i> rather than knowledge <i>about</i> literacy, numeracy and science, and on the pedagogical content knowledge capable of being assessed in a test of this nature.</p> <p>It is not clear what attention has been given to the establishment of a sustainable model for ongoing test development and delivery, and a possible model is suggested.</p>
2	'supported'	<p>Very good progress has been made by the Queensland College of Teachers in establishing the <i>Framework for Advanced Professional Development</i> as a new structure for advanced professional learning in literacy, numeracy and science teaching and assessment.</p> <p>It is <u>recommended</u> that the membership of the key 'Module Endorsement Panels' be reconsidered with a view to increasing the proportion of members with high-level substantive expertise in each area.</p> <p>Education Queensland is providing extensive professional development under the Science Spark and National Partnership programs. More explicit specification of the knowledge, skills and understanding that teachers are expected to develop through these PD activities may be desirable.</p>
3	'supported'	<p>Excellent progress has been made in increasing 'specialist' literacy, numeracy and science support in schools through the appointment and training of 130 <i>literacy and numeracy coaches</i>, 100 full-time <i>Primary Science Facilitators</i> and 15 <i>Regional Managers (Science)</i>.</p> <p>It is <u>recommended</u> that consideration be given to the formal certification of 'specialist' knowledge in literacy, numeracy and science teaching and to the possibility of that certification contributing to the future achievement of AITSL standards (eg, highly accomplished and/or lead teacher levels).</p>
4	'in-principle support'	<p>Very limited progress has been made in implementing the original QEPR recommendation: to introduce standard science tests as a discretionary classroom/school resource in a form that allows student performance to be evaluated against year levels expectations in Years 4, 6, 8 and 10 and individual progress in science to be monitored across the years of school.</p> <p>It is <u>recommended</u> that consideration be given to advancing the introduction of standard science tests at Years 4, 6, 8 and 10 <i>for school use</i> in identifying students who are not meeting year level expectations and for monitoring student progress over time.</p>
5	'supported'	<p>Good progress has been made towards a new structure and program of advanced professional learning for primary school leaders through the establishment of the <i>Queensland Educational Leaders Institute</i>, the co-hosting of the new <i>Australian Institute for Teaching and School Leadership</i> and the introduction of the <i>Teaching and Learning Audit</i> of all state schools in 2010.</p> <p>It is <u>recommended</u> that consideration be given to using the eight domains of the Teaching and Learning Audit tool as a basis for developing and implementing professional learning programs for school leaders.</p>

# 1 Ensuring Pre-Requisite Knowledge

The QEPR report observed that, in high-performing education systems, a priority is placed on recruiting highly able people into the teaching profession. That report concluded that government policies can have a significant influence on the calibre of people entering teaching and on the status of the teaching profession itself. Finland and South Korea were given as examples of countries that have succeeded in raising the quality of entrants to the teaching profession through rigorous selection processes and attention to the quality of pre-service teacher education courses.

## QEPR Recommendation 1

QEPR Recommendation 1 was based on international research evidence that teachers' own levels of subject knowledge and pedagogical content knowledge are key determinants of classroom teaching effectiveness. Evidence presented to the QEPR review indicated that some graduating teachers have minimally adequate levels of content knowledge in literacy, mathematics and science. The proposal that graduating teachers be required to demonstrate at least minimally acceptable standards of content knowledge and pedagogical content knowledge as a condition of registration was contained in the earlier reports of both the National Inquiry into the Teaching of Literacy and the National Numeracy Review.

The QEPR report gave examples of countries that have well-established methods of ensuring that beginning teachers meet minimally acceptable standards, including England (the qualified teacher status QTS skills tests in numeracy, literacy and information and communications technology) and the United States (the *Praxis II: Subject Assessments* which are used as part of the teacher registration process in almost all states to assess content knowledge and general and subject-specific teaching skills and knowledge).

### QEPR Recommendation 1

That all aspiring primary teachers be required to demonstrate through test performances, as a condition of registration, that they meet threshold levels of knowledge about the teaching of literacy, numeracy and science and have sound levels of content knowledge in these areas.

The tasks of setting threshold requirements and developing and administering the proposed proficiency tests was envisaged as a task for the Queensland College of Teachers (QCT) which would make satisfactory performance on these tests a requirement for full registration to teach in Queensland primary schools.

## 1.1 Pre-Registration Test for Aspiring Primary Teachers

The Queensland Government's Response to the Queensland Education Performance Review endorsed QEPR Recommendation 1.

On 24 February 2010, the Queensland Parliament passed a Bill amending the *Education (Queensland College of Teachers) Act 2005* to provide the legislative framework enabling the QCT to implement a system for testing aspiring early childhood and primary school teachers in literacy, numeracy and science prior to registration<sup>2</sup>.

Under this amendment, teachers who apply for full or provisional registration must take the pre-registration test and achieve a result that the QCT considers satisfactory in order to be eligible for registration. Teachers who are already registered, whose registration has lapsed, or who hold registration as a teacher in another Australian jurisdiction or New Zealand will not be required to take the test to satisfy the conditions for registration as a teacher in Queensland.

The Bill provides that a regulation may be made to prescribe a test for literacy, numeracy and science for registration. The regulation may provide for a range of matters such as details of what is to be tested, who must take a prescribed test, when and how often the test can be taken, and any fees payable.

Under the Bill, the College's testing function includes developing or purchasing the tests, revising the tests as necessary, developing supporting documentation and procedures for the administration of the tests, conducting and marking the tests, assessing the results and providing persons with their results, analysing systemic information about the performance of those who take the tests and reporting the results of such analysis to the Minister, the chief executive and higher education institutions.

At the time of writing, the Queensland College of Teachers was providing the following advice on its website<sup>3</sup>:

- applicants for teacher registration in Queensland whose qualification enables capacity to teach within the P-7 range in primary schools will need to demonstrate satisfactory levels of achievement on the test;
- the test will comprise three test instruments, one each in Literacy, Numeracy and Science;
- the test instruments will be developed using items in multiple choice format and will be delivered electronically;
- testing will be conducted in designated testing centres with appropriate security including identity and eligibility checking and test supervision;
- candidates will be responsible for booking their own test sessions; and
- candidates who fail to achieve acceptable levels in any instrument will be able to re-sit that instrument to a maximum of three attempts within a 6 month period.

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<sup>2</sup> *Child Care and Another Act Amendment Bill 2010*

<sup>3</sup> <http://www.qct.edu.au/QEPR/recommendation1.html>

Progress in implementing the new tests has included: facilitating input and advice from small expert working groups; developing content parameters for the test as advice to test developers; and developing invitations to offer to identify contractors for (i) the development of the test and (ii) assessment and test administration services.

## 1.2 Comments and Recommendations

The Queensland Education Performance Review (QEPR) was undertaken in response to concerns about the performances of Queensland primary students in NAPLAN (reading, writing, spelling, punctuation and grammar and numeracy) and the Trends in International Mathematics and Science Study (TIMSS).

QEPR Recommendation 1 was an attempt to ensure that all beginning primary teachers have:

- (1) the personal literacy, numeracy and science knowledge and skills necessary for effective teaching and professional practice (ie, adequate *content knowledge*); and
- (2) a working knowledge of effective strategies for increasing students' reading, writing, spelling, punctuation, grammar, numeracy and science knowledge and skills (ie, adequate *pedagogical content knowledge*).

The tests proposed in the QEPR report were envisaged as relatively sharply focused. They were not envisaged as an assessment of everything that might be covered in a pre-service teacher education program, or of everything that teachers 'need to know' about literacy, numeracy and science. This general intention is consistent with the approach being adopted by the QCT:

In being certified as completing requirements for approved pre-service programs, graduands demonstrate achievement of the professional standards at graduate level. This judgement is made through a comprehensive and robust assessment program that targets all aspects of the program, including professional experience... It is not intended that this testing will or can canvass the same breadth of coverage.

(QCT, 2010a)

The test framework drafted by the QCT is shown in Table 1.1.

### **Content Knowledge**

A general observation that can be made of the proposed test framework is that it takes a broader view of 'content knowledge' than was envisaged in the QEPR report.

In literacy and numeracy, the draft framework divides 'content knowledge' into 'knowledge and understanding of content and processes' and 'personal skills'. In Science, content knowledge is defined only in terms of 'knowledge and understanding of content and processes'. The QEPR report envisaged 'content knowledge' as including personal knowledge, understandings and skills, and so this division is not inconsistent with the report's intentions. However, some of the knowledge and understandings included in the

‘knowledge and understanding of content and processes’ component goes beyond what was envisaged for inclusion in the pre-registration tests.

Table 1.1  
Proposed Test Framework (QCT, 2010a)

		<b>Literacy</b>	<b>Numeracy</b>	<b>Science</b>
<b>content knowledge</b>	knowledge and understanding of content and processes	knowledge of: <ul style="list-style-type: none"> <li>• sociocultural aspect of literacy</li> <li>• language and texts</li> <li>• the process of meaning making</li> <li>• “self” as literate practitioner</li> </ul>	knowledge of: <ul style="list-style-type: none"> <li>• number</li> <li>• algebra</li> <li>• measurement</li> <li>• geometry</li> <li>• statistics and probability</li> </ul>	knowledge of: <ul style="list-style-type: none"> <li>• ways of working</li> <li>• science as a human endeavour</li> <li>• Earth and beyond</li> <li>• energy and change</li> <li>• life and living</li> <li>• natural and processed materials</li> </ul>
	personal skills	skills in: <ul style="list-style-type: none"> <li>• reading – comprehending a range of texts</li> <li>• reading – recognising, analysing, synthesising and evaluating textual features</li> <li>• writing – generating complex written texts</li> <li>• writing – using appropriate textual features</li> </ul>	skills in: <ul style="list-style-type: none"> <li>• analysing and synthesising mathematical information</li> <li>• applying mathematical knowledge in everyday contexts</li> <li>• using mathematical language and representation to communicate</li> </ul>	
<b>pedagogical content knowledge</b>		knowledge of: <ul style="list-style-type: none"> <li>• curriculum frameworks</li> <li>• teaching literacy</li> <li>• diagnosis, monitoring and assessment</li> </ul>	knowledge of: <ul style="list-style-type: none"> <li>• curriculum frameworks</li> <li>• teaching numeracy</li> <li>• diagnosis, monitoring and assessment</li> </ul>	knowledge of: <ul style="list-style-type: none"> <li>• curriculum frameworks</li> <li>• teaching science</li> <li>• diagnosis, monitoring and assessment</li> </ul>

This is not to say that the broader set of knowledge and understandings identified in the draft framework is not important. Indeed, the assessment of these aspects of knowledge and understanding may be essential to a comprehensive assessment of a pre-service teacher education program. It is simply to observe that some aspects identified in the draft framework go beyond the more sharply focused purposes of the pre-registration tests as envisaged in the QEPR report.

One of the ways in which the draft framework goes beyond the envisaged tests is through its inclusion of teacher knowledge *about* literacy (Figure 1.1) and teacher knowledge *about* science (Figure 1.2).

In *literacy*, ‘knowledge and understanding of content and processes’ is defined primarily as knowledge *about* literacy as shown in Figure 1.1.

- **Community participation and texts** – text users and text producers participate in the social and cultural activities within communities, including indigenous communities (as readers and writers for instance) and that such participation affects the nature of literacy practices gained.
- **Texts are located and have influence** – texts are part of these communities (above) e.g. families, institutions and systems can influence meaning and language choices and community values and beliefs influence our understanding and ability to use and produce texts.
- **Texts and points of view** – texts are representative of different points of view and these points of view can be challenged.
- **Codes and structures around text/domains of knowledge** – the codes and structures that surround texts i.e. particular domains of knowledge, such as science and maths, have recognisable ways of sharing and communicating knowledge, and that different social and cultural groups may communicate in recognisable but different ways.
- **Language and thinking** – language is indicative and representative of thought and is the communicative enactment of thinking.

*Figure 1.1 Teacher knowledge about sociocultural aspects of texts*  
(QCT, 2010a)

In *science*, ‘knowledge and understanding of content and processes’ is defined as a combination of knowledge about science and knowledge of scientific facts and processes, as shown in Figure 1.2.

Pre-registration tests guided by this framework could include literacy and science items to test whether aspiring teachers know, for example, that:

- different social and cultural groups may communicate in recognisable but different ways;
- texts are representative of different points of view and these points of view can be challenged; and
- cultures from around the world, including those of Aboriginal people and Torres Strait Islander people, have contributed to scientific understanding and scientific practice.

Science may help to influence society through the posing and responding to social and ethical issues and science research is influenced by societal challenges or social priorities. This organiser highlights the need for informed, evidence-based decision making about real-world current and future applications of science.

**Science in everyday life**

- Science has applications in daily life, including at home, at school, at work and in leisure time. Scientific ideas can be used to explain the development and workings of everyday items and phenomena

**Science and ethics**

- Science can help to make natural, social and built environments sustainable at a scale ranging from local to global and may influence personal human activities.
- Responsible, ethical and informed decisions about real-world issues and social priorities may benefit from the application of scientific understanding.

**Contributions of the past**

Scientific knowledge including from Australia has been accumulated and refined over time, and can be used to change the way people live.

- Cultures from around the world, including those of Aboriginal people and Torres Strait Islander people, have contributed to scientific understanding and scientific practice.
- Immediate and long-term consequences of human activity can be predicted by considering scientific understandings of past and present events, discoveries, inventions and innovations.

*Figure 1.2 Teacher knowledge about science as a human endeavour (QCT, 2010a)*

As important as these higher-level understandings in literacy and science may be, they go beyond the narrower focus envisaged for the pre-registration tests.

In *numeracy*, the required content is defined as mathematical knowledge (mathematical facts and processes) in a way that is more closely aligned with the intentions of the QEPR recommendation.

The tests of ‘content knowledge’ in QEPR Recommendation 1 were proposed as a way of ensuring that all beginning primary teachers themselves have sound levels of personal knowledge and skill in reading, writing, spelling, punctuation, grammar, numeracy and science. The proposed QCT framework extends beyond the scope of the original recommendation. A more consistent framework would be one in which ‘content knowledge’ and ‘pedagogical content knowledge’ were identified for each of literacy, numeracy and science, with the sociocultural content of the literacy and science ‘content knowledge’ constructs removed.

The kinds of test items imagined for the ‘content knowledge’ section of the test are shown in Figures 1.3, 1.4 and 1.5. Each item is a direct test of an aspiring teacher’s personal knowledge and skills in literacy, numeracy and science.

Please put the key to the resource cupboard back on \_\_\_ hook.

- A. it's
- B. it/s
- C. its'
- D. its

*Figure 1.3 Example of possible literacy content knowledge item*

In a test a student scored 18 marks out of 25.  
What was the student's score as a percentage?

- A. 13.8%
- E. 45%
- F. 72%
- G. 90%

*Figure 1.4 Example of possible numeracy content knowledge item*

A group of students is doing a project on oceans. They have read that daily ocean tides are caused by the moon. Which of the following is best used to explain to the group how the moon causes tides?

- A. gravitation
- B. lunar phases
- C. surface tension
- D. temperature changes

*Figure 1.5 Example of possible science content knowledge item*

Tests of content knowledge should not be limited to tests of factual and procedural knowledge, but also should include assessments of higher-order thinking in literacy, numeracy and science (eg, Figure 1.6).

A teacher asked some students to design and conduct an experiment about the growth of peas and beans. The students placed soil in two ice-cream containers and planted several peas in one and several beans in the other. They added plant food to the soil in which the beans were planted, but had none left for the other container. They then placed both containers side-by-side on the windowsill. The students gave both containers the same amount of water every second day and measured and recorded the heights of the pea and bean seedlings as they grew.

What conclusion about the growth of peas and beans does the students' experiment best support?

- A. Peas and beans need light to grow.
- B. Peas and beans need water to grow.
- C. Plant food makes beans grow faster.
- D. Peas and beans can be grown in ice-cream containers.

*Figure 1.6 Example of possible science content knowledge item*

### **RECOMMENDATION**

That in measuring 'content knowledge' in literacy, numeracy and science, the planned pre-registration tests assess the extent to which aspiring teachers have mastered, at a high level, the knowledge, understandings and skills that students are expected to learn by the end of primary school.

The examples in Figures 1.3 to 1.6 also reflect another recommendation for the pre-registration tests:

### **RECOMMENDATION**

That, to the extent possible, all test items be set in realistic classroom/school contexts.

### **Pedagogical Content Knowledge**

The draft framework for the pre-registration tests also defines 'pedagogical content knowledge' somewhat more broadly than was envisaged by the QEPR report. Again, 'knowing how to teach' a subject is a very broad domain, and pre-service teacher education programs are likely to address – and presumably assess – a broader range of teacher pedagogical knowledge than was envisaged for the pre-registration tests. It should be remembered that aspiring primary teachers will be entering the profession at the beginning level and that the purpose of the pre-registration assessment is to ensure that minimum

benchmark standards of pedagogical content knowledge are met by candidates that can be demonstrated in a one- to two-hour test.

Some of the ways in which the framework goes beyond what was envisaged are illustrated in Figure 1.7.

Aspiring teachers' abilities to use curriculum frameworks for short, medium and long-term planning; to use a range of authentic assessment methods (peer assessment, self-assessment, journals, portfolios, classroom observations, etc); to use ICT to create rich classroom learning opportunities; to teach literacy and numeracy across the curriculum; and to link curriculum, planning, teaching and assessment would be difficult to assess in the kinds of tests envisaged here. As important as these elements of good teaching are, the pre-registration tests were not envisaged as a test of everything that teachers need to know and be able to do.

Rather, the tests were envisaged as addressing a narrower subset of 'pedagogical content knowledge' with a focus on teachers' knowledge of, and ability to implement, effective teaching strategies and their abilities to identify and address individual learning needs.

- use curriculum frameworks for undertaking short, medium and long-term planning for class/es
- make explicit links between: what is required to be taught (systemic numeracy requirements), planning for teaching and learning, the enacted curriculum (learning experiences and teaching strategies) and assessment (using the Numeracy Indicators)
- identify and explicitly teach mathematics for numeracy in other curriculum areas
- teach literacy through a balanced approach that includes the integrated use of whole language, genre and socio-critical approaches
- embed ICTs to create learning opportunities where students actively use ICTs to access, organise, research, interpret, analyse, create, communicate and represent knowledge e.g. digital journals and internet research from a critical stance

*Figure 1.7 Examples of identified pedagogical content knowledge*  
(QCT, 2010a)

Examples of possible pedagogical content knowledge items are shown in Figures 1.8 and 1.0.

Lucy wrote the following answers to the first three questions.

$$4/16 - 1/8 = 3/8$$
$$5/9 - 1/2 = 4/7$$
$$7/16 - 1/5 = 6/11$$
$$9/11 - 1/7 =$$

Based on her first three answers, what answer is Lucy most likely to give to the fourth question?

- A. 9/18
- B. 8/7
- C. 8/4
- D. 10/4

*Figure 1.8 Example of possible numeracy pedagogical content knowledge item*

In Ms Holloway's Year 6 class, English is a second language for half of the students. As a speaking and listening activity to develop formal speaking skills, Ms Holloway plans to have pairs of students prepare interviews and then present each other to the class. Which of the following has the strongest potential for helping the students with a language background other than English to perform well in this activity?

- A. Presenting a model of an interview in which Ms Holloway interviews a student and then introduces her.
- B. Providing a set of written guidelines on conducting an interview and introducing another person.
- C. Having students discuss in small groups what completing the interview successfully will require.
- D. Distributing a rating scale to show how the interviews and introductions will be assessed.

source: The Praxis Series (USA)

*Figure 1.9 Example of possible literacy pedagogical content knowledge item*

**RECOMMENDATION**

That in measuring 'pedagogical content knowledge' in literacy, numeracy and science, the pre-registration tests give priority to assessing aspiring teachers' understandings of effective strategies for teaching and their abilities to analyse and address learning needs, misunderstandings and difficulties.

### Ongoing Testing Arrangements

Consideration will need to be given to arrangements for the ongoing delivery of the *Pre-Registration Test for Aspiring Primary Teachers*.

One model that may be worthy of consideration is the model that has been used for the Australian medical admissions tests: the Graduate Australian Medical School Admissions Test (GAMSAT) and the Undergraduate Medical and Health Sciences Admission Test (UMAT). That model has the following features:

- a policy committee has been established (in this case by the universities). The role of the policy committee is to oversee and approve the test framework, decide all policy matters in relation to the testing program and approve the test materials developed in each year.
- an external agency has been tasked with developing and administering the tests annually and reporting candidates' test results. The tasks of the agency include test development, trial testing all materials, organising testings sessions, managing candidate registrations, scoring the tests, reporting test results, and providing a technical report on each year's testing program to the policy committee.
- candidates pay a fee to sit the tests. This fee is set by the policy committee in consultation with the external agency. It covers the external agency's costs for annual test development and test administration and provides for ongoing research into the test (the policy committee sets the research priorities).

In developing a model for this testing program, consideration also should be given to the possibility of other jurisdictions wishing to use the *Pre-Registration Test for Aspiring Primary Teachers* in the future. (For example, the Undergraduate Medical and Health Sciences Admission Test was developed initially as the Newcastle Medical Selection Test for the medical faculty at the University of Newcastle and was later adopted by medical schools throughout Australia.) In establishing testing arrangements, early consideration should be given to ways of scaling up the testing program and making the tests available nationally if there is broader interest in the future.

#### RECOMMENDATION

That consideration be given to models for the sustainable delivery of the *Pre-Registration Test for Aspiring Primary Teachers*, including the model that has been used for the Australian medical admissions tests. The chosen model should allow for the possibility of the test being adopted by other jurisdictions in the future.

## 2 Building Expertise

The QEPR report observed that very high-performing education systems put considerable effort into clarifying what excellent teaching looks like – including what excellent teachers know and do – and into supporting teachers to become highly effective practitioners. A conclusion of the report was that initiatives to build teacher expertise are likely to be more effective if they:

- are focused on changing classroom practices and, in particular, giving teachers a wider repertoire of effective teaching strategies;
- are part of a whole-school effort to improve learning outcomes for all students;
- are targeted on individual teachers' needs and readiness;
- develop teachers' content knowledge and pedagogical content knowledge;
- increase teachers' familiarity with research evidence around best practice;
- are an integral part of a teacher's ongoing work and learning (rather than an isolated event);
- include the detailed analysis of student responses and work;
- involve teachers working together and learning from each other; and
- are supported by a school culture of coaching and mentoring.

### **QEPR Recommendation 2**

QEPR Recommendation 2 envisaged the specification and development of a number of professional learning modules in literacy, numeracy and science:

The modular approach would enable schools and teachers to select modules appropriate to their particular needs. The modules would be designed to extend teachers' content knowledge and pedagogical content knowledge, including their knowledge and skills in diagnosing learning difficulties, assessing and monitoring student progress, and targeting teaching on individual needs and readiness. Each module would draw on, and familiarise participants with, evidence from research and best practice in the teaching of literacy, numeracy and/or science. Each module also would have a significant practice-based component requiring teachers to apply and explore the content of the module in their own classrooms.

Key features of the proposed modules are that they would be undertaken over a period of time, be delivered by accredited providers and have an associated assessment requirement (usually involving a classroom application). Providers would be expected to make provision for the delivery of modules by distance education.

It is envisaged that the responsible government agency would develop broad specifications for the set of modules, with the exact content and assessment requirements of each module being developed by providers. The responsible agency would review how providers proposed to develop and deliver the modules and endorse proposed modules for use by schools. The agency also would keep a record of teachers' successful completion of modules.

Where a provider is a university or a consortium involving a university, consideration should be given to the possibility of successfully completed modules being credited towards a postgraduate qualification (graduate certificate, graduate diploma or master's degree).

The proposed approach would require the development of a coherent program of professional learning modules designed to build expertise in the teaching of literacy, numeracy and science. Some modules would build on to other modules in the program in a sequential way.

(QEPR Report, pp 70-1)

#### QEPR Recommendation 2

That the Queensland Government introduces a new structure and program of advanced professional learning in literacy, numeracy and science for primary school teachers.

## 2.1 Initiatives and Progress

The Queensland Government has commissioned the development of an advanced professional learning framework in literacy, numeracy, science and assessment capability for primary school teachers and school leaders:

This framework, which is to be developed and administered by the Queensland College of Teachers (QCT), is designed to assist teachers and school leaders in all schooling sectors to locate programs that match their identified learning goals within priority areas and that offer intensive, high quality evidence-informed professional development with sustained focus and commitment.

The framework will provide the basis for endorsement of professional development modules developed by a range of providers, including universities, school sectors and other education providers. It is envisaged that modules based on the framework will build advanced professional capability of teachers and school leaders and will enable articulation to higher education programs.

The three schooling sectors will be able to nominate priority areas within the FAPD that will align with the continuing professional development requirements of the QCT for teachers to maintain their registration. The QCT's *Continuing Professional Development (CPD) Framework* incorporates a requirement for teachers to demonstrate CPD that includes provision for employer-directed professional development within the annual professional development completed.

Practising teachers and school leaders need to have adequate knowledge of teaching and supporting effective teaching in literacy, numeracy and science as well as assessment capability in these and all curriculum areas. To ensure this is the case in state schools, *the Government will make completion of professional development in these areas mandatory for state school teachers.*

(QCT, 2010b)

The Framework for Advanced Professional Development has been developed by the Queensland College of Teachers with input from small

expert working groups and consultation with schooling sectors and higher education institutions:

The FAPD is developed for the audience of potential providers of advanced professional development. It provides the basis for endorsement of professional development modules developed by a range of providers, including universities, school sectors and other education providers. It is envisaged that modules based on the FAPD will provide opportunity for teachers and school leaders to build advanced professional capability and will provide articulation to higher education programs.

The FAPD outlines professional development outcomes for teachers and school leaders at the foundational, proficient, highly accomplished and lead phases of teacher development, and for school leaders in the areas of literacy, numeracy, science and assessment capability.

It is envisaged that providers of advanced professional development will develop modules that incorporate a selection of outcomes relevant to a target cohort combined with effective and constructive learning approaches that demonstrate the requirements for modules to be endorsed under this framework. (QCT, 2010b)

The FAPD identifies professional development *outcomes* in literacy, numeracy, science and assessment at foundational, proficient, highly accomplished and lead phases of teacher development, and for school leaders. The outcomes cover:

- Content knowledge – the knowledge and understanding of the content and processes of literacy, numeracy or science;
- Pedagogical content knowledge – knowledge and understanding of what students need to learn (knowledge of curriculum frameworks), how students’ understandings in a subject typically develop, how to engage students and sequence subject matter, the kinds of misconceptions that students commonly develop, and effective ways to teach a subject; and
- Assessment – ways of collecting and using assessment data to diagnose, assess and monitor student performance and plan student learning experiences in literacy, numeracy and science.

The requirements of FAPD modules are contained in the Appendix.

## 2.2 Comments and Recommendations

The Framework for Advanced Professional Development directly addresses the key intentions of QEPR Recommendation 2 by providing a framework for the development and delivery of advanced, research-based modules designed to build teacher knowledge and skills in the areas of content knowledge, pedagogical content knowledge and assessment in each of literacy, numeracy and science. The development of criteria and processes for the QCT endorsement of modules are consistent with Recommendation 2 and provide a basis for ensuring high quality professional development.

The proposal to align modules with explicit outcomes at foundational, proficient, highly accomplished and lead phases of teacher development is a

very positive suggestion and introduces the possibility of sequencing modules across these phases.

The decision to require module developers to identify explicit criteria for module completion, to define assessment requirements and to identify arrangements for advanced standing or accreditation towards a further qualification also is consistent with Recommendation 2 and is a positive feature of the work currently underway.

The extent to which the Framework for Advanced Professional Development achieves its purpose of ensuring high quality professional development for teachers in literacy, numeracy, science and assessment – with a particular focus on the development of content knowledge and pedagogical content knowledge in these areas – will depend, ultimately, on the content of the modules that are developed and endorsed, including the rigour of their provisions for the assessment of learning resulting from each module.

Endorsement of modules is the responsibility of the ‘Professional Development Module Endorsement Panels’ established by the QCT. Proposed membership of these panels is:

- one employing authority representative
- one practising teacher with expertise in the relevant area
- one higher education representative with expertise in the relevant area
- one member of the Professional Standards Committee (PSC) of the QCT
- two principal representatives drawn from two different Principal Associations
- one member of QCT staff – initially, QCT Queensland Education Performance Review (QEPR) project team and then, Professional Standards Unit.

This proposed membership appears heavy on ‘representation’ and light on high-level substantive expertise in the relevant area. Consideration might be given to ensuring that most members have a level of substantive expertise in the relevant area (eg, by increasing the proportion of science educators and perhaps scientists among the members of the Science Panel) and/or to changing the membership mix to ensure this.

#### **RECOMMENDATION**

That consideration be given to the proposed composition of the ‘Professional Development Module Endorsement Panels’ to reduce the emphasis on ‘representation’ and to increase the proportion of members with high-level substantive expertise in the relevant area.

## 2.3 Education Queensland PD Initiatives

Education Queensland has committed to publishing a list of employer-directed and supported continuing professional development programs endorsed by the QCT on the EQ website.

Education Queensland also has drafted an 'Education Queensland Professional Development Plan for State Schools'. The plan outlines professional development activities for state school staff (teachers and leaders) from 2010 to 2012. All principals will use the plan in discussions with teaching staff about performance development objectives.

The Plan outlines key professional development priorities with a focus on building teachers' skills in teaching Literacy, numeracy and science. Initiatives in 2010 include:

- a requirement that all newly recruited primary teachers and Years 8-9 teachers participate in a five-day literacy professional development program;
- the provision of professional development opportunities for P-9 teachers focused on enhancing teachers' knowledge, pedagogy and understanding of numeracy across the curriculum;
- the provision of professional development opportunities for Year 4-7 teachers as part of the *Science Spark* initiative; and
- new online professional development materials to enhance teacher and leader confidence in accessing and using student performance data.

The targets for delivering professional development in science to teachers of Years 4 to 7 are to deliver PD to: 15% of teachers by June 2010; 60% of teachers by June 2011; and 100% of teachers by June 2012.

In addition to these professional development programs, Education Queensland has produced a range of curriculum support materials, some of which were examined as part of this review. Examined materials included:

- The Roadmap for Curriculum, Teaching, Assessment and Reporting in Years 1-9
- Time Allocations for English, Mathematics and Science – Years 1-7
- School Curriculum Planning Guide for Years 1-9
- P-9 Literacy and Numeracy Indicators, Information Statement
- Teaching English
- Teaching Mathematics
- Teaching Science
- Teaching Reading and Viewing Guides Years 1-3, 4-7, 8-9
- Teaching Writing Guides Years 1-3, 4-7, 8-9

## 2.4 Comments and Recommendations

A variety of professional development programs have been offered for Principal Project Officers - QCAR, First Steps Facilitators, Science Spark Regional Managers, and Literacy and Numeracy coaches. For most of these

programs, the provided documentation has not made it possible to draw conclusions about the quality or usefulness of the provided professional development except to say that the broad topics covered appear relevant to efforts to improve literacy, numeracy and science teaching and learning in schools.

One general observation that can be made of provided overview documents relating to teacher professional development programs is that they specify general topics and PD activities, but are not explicit about the new knowledge, skills and understandings that teachers are expected to develop as a result of their participation (ie, the learning outcomes of the professional development).

For example, in Figure 2.1, the ‘key concept’ underpinning the Diversity module is identified, and a list of activities is provided. No doubt the providers are clear about the new knowledge, skills and understandings that participants are expected to develop as a result of these activities, but they are not made explicit in the provided documentation.

<p><b>Module:</b> Diversity</p> <p><b>Key Concept:</b> Students in Years 4 to 6 are special</p> <p><b>Content and Activities</b></p> <ul style="list-style-type: none"> <li>• discussion re the students in 4 to 6</li> <li>• Year 5 test data + updated NATSEM data</li> <li>• Connectedness and McNaughton’s funnel, connecting with kids</li> <li>• Links to Productive Pedagogies</li> <li>• No Blame Culture</li> <li>• Educational disadvantage</li> <li>• Shirley Brice-Heath’s research</li> <li>• Discourse</li> </ul>
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*Figure 2.1 Excerpt from overview of 5-day Literacy PD program (Years 4-7)*

Figure 2.2, an excerpt from the overview of the Years 8-9 Literacy PD program, identifies ‘participant deliverables’, but these take the form of descriptions of what participants will *do* during the course, rather than descriptions of what new learning is expected.

<p><b>Key Messages</b></p> <ul style="list-style-type: none"> <li>• Understanding the relationships between literacy, curriculum, learning, teaching and assessment allows teachers to refine their literacy teaching practices.</li> <li>• These literacy teaching practices include analysing texts to identify salient language features and using the Teaching and Learning Cycle (TLC) to plan, explicitly teach and assess.</li> </ul> <p><b>Participant Deliverables</b></p> <p>By the conclusion of the course each participant will:</p> <ul style="list-style-type: none"> <li>• Write an exemplar linked to an assessment task</li> <li>• Analyse the exemplar to identify the salient language features</li> <li>• Annotate the TLC identifying opportunities and possibilities for explicit teaching</li> </ul>
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*Figure 2.2 Excerpt from overview of 5-day Literacy PD program (Years 8-9)*

**RECOMMENDATION**

That consideration be given to the making more explicit the particular knowledge, skills and understandings that participants are expected to develop as a result of their participation in each Professional Development activity (ie, anticipated learning outcomes).

### 3 Specialist Teachers

The QEPR report noted that a general strategy for raising levels of literacy, numeracy and science in primary schools is to increase the number of teachers with advanced training and expertise in these curriculum areas and to encourage schools to make greater use of these teachers as coaches and mentors to other teachers, in team teaching, and in providing general curriculum leadership to these areas.

#### QEPR Recommendation 3

More specifically, the QEPR report noted calls from some Queensland state schools for greater support in the form of specialist advice in the areas of literacy, numeracy and science teaching and learning. It was noted that at least one district office had built staff capacity of this kind and was running professional development sessions for teachers and school leaders, attending and leading in-school curriculum discussions and coaching teachers individually as required. In some schools, specialist teachers (e.g., in mathematics and science) were involved in team teaching, leading extra-curricular activities such as the school's participation in science projects and competitions, and in one of the schools visited, maintained a special science room/laboratory.

The Review also noted the existence of programs in other parts of Australia which had appointed and trained 'specialist' teachers to work alongside colleagues in schools, sharing expertise with other teachers and assisting in building the capacity of the entire school to improve literacy, numeracy and science learning.

It was recommended that consideration be given to increasing the number of 'specialist' teachers with advanced training and expertise in literacy, numeracy and science:

#### QEPR Recommendation 3

That additional funding be made available for the advanced training and employment of a number of 'specialist' literacy, numeracy and science teachers to work in schools (and/or district offices) most in need of support.

### 3.1 Initiatives and Progress

#### **Literacy and Numeracy Coaches**

In 2009-2010 the Department allocated \$14 million to employ, train and deploy literacy and numeracy coaches in schools under the Literacy and Numeracy National Partnership – a joint initiative of the Australian Government, the Queensland Government, the Queensland Catholic Education Commission and Independent Schools Queensland.

Through this initiative 130 coaches (equivalent to 91 full-time teachers) are now working directly with teachers in 175 Literacy and Numeracy National Partnership state schools to deliver professional development and to build teaching skills in literacy and numeracy.

The selection and recruitment of literacy and numeracy coaches was undertaken in August-September 2009. The key responsibilities of the newly-appointed coaches were described by the Department's Position Description for the role and include:

- leading and coordinating the coaching of classroom teachers in literacy and/or numeracy;
- leading the implementation and review of school literacy and numeracy programs;
- reviewing teaching and learning strategies in literacy and numeracy;
- modelling quality teaching across the Early and Middle phases of learning;
- providing teachers with professional development;
- supporting the analysis of and response to systemic and student data; and
- promoting evidence-based communities of practice.

A 'fact sheet' elaborates on the role:

The coaches will work directly with teachers and school teams to improve student performance in literacy and numeracy.

The coaches will assist teachers to build teaching skills and leadership through support and professional development.

The introduction of coaches in Literacy and Numeracy National Partnership schools will focus on whole-school improvement as well as on individual teachers. A coach's intensive one-on-one approach in supporting teachers is a new strategy for many schools.

(Department of Education and Training, 2009a)

Following their appointment, the coaches attended a Professional Learning Conference on 5-6 October 2009. The focus of professional development for coaches – which have continued in 2010 – has been on understanding the coaching process, the de-privatisation of teacher practice, principles of adult learning, strategies for building and sustaining professional relationships, and discussions around pedagogical content knowledge in literacy and numeracy.

The Department appointed lead coaches to work with literacy and numeracy coaches within regions. Through newsletters, teleconferences, online discussions and face-to-face meetings, lead coaches are facilitating the discussion of coaches' work in schools, sharing effective teaching and learning strategies across schools, and coordinating the joint development of new materials:

Many regions have been active in developing strong coach networks. These networks are proving to be a vital avenue for sharing ideas and resources, providing collegial support, and conducting professional development conversations... [For example,] every fortnight the Townsville area coaches attend dedicated professional development

sessions where they share success and practices. They discuss any potential concerns and collectively solve problems, and at their recent meeting they collaborated to develop resources for all to use at teachers' professional development sessions, for example, they designed and collected resources for a workshop on Guided Reading.

(Department of Education and Training, 2010a)

At least some (and possibly all) of the literacy and numeracy coaches are keeping records of their activities in the schools in which they are working. Available evidence suggests that there may be differences among coaches in the proportions of time they are spending on co-planning and co-teaching lessons, modelling and demonstrating teaching, observing colleagues teaching, providing feedback, and conducting professional development – possibly reflecting different needs in different schools.

### **Primary Science Facilitators**

In 2009 the Queensland Premier made a commitment to:

- the employment of 100 new science teachers to work in primary schools with a focus on Years 4 to 7; and
- the employment of an additional 15 science teachers to roll out a comprehensive professional development program to support the teaching of science in primary schools over three years.

The 100 full-time 'Primary Science Facilitators' (PSF) appointed under this commitment are experienced teachers of science. They commenced their new roles in regions in January-March 2010 and have been tasked with assisting other teachers in planning, delivering and assessing effective science teaching in Years 4 to 7. Expectations of the PSFs include:

- delivering demonstration lessons;
- observing and providing feedback on lessons; and
- co-teaching lessons or aspects of a lesson.

The Primary Science Facilitators were trained in Term 1 2010. The training included an introduction to *Science Spark*, an initiative designed to rejuvenate interest in science teaching and to reignite student interest in the subject. *Science Spark* builds on support for the implementation of the *PrimaryConnections* program in schools in the period 2003-2009. Training also addressed strategies for coaching and mentoring colleagues, the draft national curriculum in primary science, inquiry-based learning, the characteristics of effective teaching, and the 5E's model of science (Engage, Explore, Explain, Elaborate, Evaluate).

An internal Departmental Briefing Note prepared at the end of Term 1 2010 observed that:

collaborative development of school science programs by PSF's and school staff has filled a major need in numerous sites. Schools have positively engaged with the PSF's. PSF's have been well received by their base schools... PSF's are working alongside 407 teachers in classrooms, modelling lessons, and this has resulted in teachers starting to implement the 5E's model of science... PSF's were given the task to

conduct a science audit. School programs are now being written where once there was none. (Department of Education and Training, 2010b)

### **Regional Managers (Science)**

The fifteen 'Regional Managers (Science)' responsible for delivering professional development to Year 4 to 7 teachers were appointed in December 2009 and commenced work in January. They participated in two 1-week training conferences in February-March. The aims of the professional development they will deliver to teachers are to:

- increase teachers' scientific knowledge;
- develop teachers' skills in the teaching of science;
- enhance teachers' confidence in teaching science;
- help teachers to make the learning of science accessible and engaging;
- improve student performance in science; and
- help build a community with a high level of scientific literacy.

As noted above, it is intended that they will deliver professional development to 15% of Year 4 to 7 teachers by June 2010, 60% of teachers by June 2011, and 100% of teachers by June 2012.

The Regional Managers (Science) also are training and coordinating the work of the Primary Science Facilitators. Principals will be assisted by a program focusing on curriculum leadership that emphasises the significance of science education in the primary curriculum and the central role of an inquiry-based approach to teaching and learning science.

## **3.2 Comments and Recommendations**

The employment and training of 130 school-based literacy and numeracy coaches under the Literacy and Numeracy National Partnership program, 100 full-time Primary Science Facilitators and fifteen Regional Managers (Science) clearly meets the intentions of QEPR Recommendation 3.

The documentation available for review makes clear that the training program for Primary Science Facilitators addressed in some detail the primary science curriculum, including expected content knowledge and the nature of inquiry-based learning. The available documentation on the professional learning conferences for literacy and numeracy coaches makes less clear the extent to which those conferences focused on issues in the teaching and learning of literacy and numeracy. The focus appears to have been primarily on the nature of coaching, adult learning principles, professional conversations, building professional relationships and the role of leadership.

The appointment of school staff to specialist literacy, numeracy and science coaching roles raises questions about the knowledge base that should be expected of all school-based coaches, the kind of professional development required to build and guarantee that knowledge base, and ways of recognising specialist teacher knowledge in these areas of the school curriculum.

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The Council of Australian Governments (COAG) has agreed to the development and implementation of a national professional teacher standards framework and accreditation process. The Australian Institute for Teaching and School Leadership established in January 2010 has been tasked with implementing the new standards-based *National Teaching Professional Framework* at graduate, competent, highly accomplished and lead teacher levels and with accrediting teachers against this framework.

The more explicit specification of the pedagogical content knowledge and skills expected of specialist school-based coaches in literacy, numeracy and science could have at least two advantages. First, it would clarify what all coaches are expected to know and be able to do and so assist with their recruitment, preparation and ongoing professional development. Second, it would provide a basis for recognising the achievement of specialist knowledge and skills in the teaching of literacy, numeracy or science. Certification of specialist knowledge and skills by the Department might then become part of the evidence used to demonstrate achievement of AITSL standards (eg, at highly accomplished or lead teacher levels).

**RECOMMENDATION**

That consideration be given to the more explicit specification of the pedagogical content knowledge and skills expected of specialist coaches in literacy, numeracy and science to assist in recruitment, preparation and professional development decisions and as a basis for 'specialist' certification that could later contribute to accreditation at highly accomplished or lead teacher levels of the AITSL standards.

## 4 Continuous Monitoring

The QEPR report noted the findings of the McKinsey study that the very best education systems internationally intervene at the level of the individual student, developing processes and structures within schools that are able to identify whenever a student is starting to fall behind, and then intervening to improve that child's performance. It was noted that many of the world's best-performing systems provide diagnostic tools that can be used to identify children who are struggling early in their schooling and to diagnose specific learning difficulties. Some provide regular system-wide assessments to provide schools and parents with an objective basis for identifying individuals who are performing below minimally acceptable standards for their grade.

### QEPR Recommendation 4

Given the relatively poor performance of Queensland primary students in science (Queensland Year 4 students were ranked last among the Australian states and territories in science in TIMSS 2007), the QEPR report concluded that there would be value in providing teachers with greater clarity about the science knowledge and understandings that students should be developing in particular years of school and in setting minimum standards that all students should meet.

It was proposed that a set of science tests be developed '*as a resource for school use* in assessing whether these standards are being met and for monitoring the science progress of students across the years of school':

#### QEPR Recommendation 4

That standard science tests be introduced at Years 4, 6, 8 and 10 for school use in identifying students who are not meeting year-level expectations and for monitoring student progress over time.

This recommendation was made in the knowledge that standard Year 4 and Year 8 TIMSS science tests would be administered again in Queensland late in 2010, with interstate comparisons from those tests becoming public in 2012.

The Government response to QEPR Recommendation 3 was 'in-principle support':

The Government sees improved teaching of science as a priority and supports the intent of this recommendation: to build students' knowledge and to communicate curriculum standards and scope to teachers. However, the Government acknowledges the views expressed by stakeholders on the suitability of introducing mandatory testing in an environment where many teachers admit to a lack of confidence and expertise in teaching science... The Government will therefore develop the skills and knowledge of Queensland primary teachers to teach and assess science more effectively before moving to provide more standardised testing through refinements to the Queensland Comparable Assessment Tasks. (Department of Education and Training, 2009c)

The reference to ‘mandatory’ testing here is puzzling. The QEPR report made clear that what was being proposed was the development of a set of science tests ‘*as a resource for school use*’. It was never envisaged that the tests would be ‘mandatory’, but that they would be available as a ‘resource’ for schools to choose to use (or not use). The proposed school resource was seen as a way of clarifying expectations of science learning through concrete examples – something that was considered more likely to build teacher confidence in teaching science than to undermine it. The resource was seen as having the potential to ‘develop the skills and knowledge of Queensland primary teachers to teach and assess science more effectively’.

In response to QEPR Recommendation 3 it was decided that the Queensland Studies Authority would:

- enhance Queensland Comparable Assessment Tasks (QCAT) to provide a rigorous common assessment for Queensland students and build a strong assessment culture amongst teachers;
- develop a range of additional science assessment tasks to be placed in the Assessment Bank for the use of schools and teachers, including sample tests that schools and teachers can access to prepare students for national and international tests; and
- analyse Queensland students’ performance in national and international tests to identify priority areas for professional development programs.

## 4.1 Initiatives and Progress

During 2009, nine Queensland Common Assessment Tasks (QCATs) in English, mathematics and science were developed and reviewed for their alignment with the Queensland Curriculum, Assessment and Reporting framework. Fourteen schools from state, independent and Catholic schools participated in field trialling the tasks in November-December 2009. A further nine English, mathematics and science QCATs for use in Years 4, 6 and 9 will be completed by late 2011.

Fifty science test items were developed and placed online by March 2010. A further 50 items were to be placed online by June 2010.

## 4.2 Comments and Recommendations

Progress in implementing QEPR Recommendation 3 has been very limited, perhaps because the intentions of the recommendation were misinterpreted.

The recommendation was for the development of a *resource* for discretionary use by schools. Concerns about ‘mandatory’ testing were advanced as a reason for not proceeding with the development of this resource.

In proposing the development of this classroom resource, the QEPR report observed that existing approaches to assessing and reporting science learning in Queensland primary schools do not provide a basis for setting clear

performance expectations (the equivalent of ‘national minimum standards’ of achievement in literacy and numeracy) or for monitoring students’ progress in science across the years of school:

Under QCAR, students’ knowledge and understandings of science concepts, facts, procedures, and processes at each year level are reported on a 5-point scale: *Very Limited – Limited – Sound – High – Very High*. A disadvantage of this system of reporting is that it does not allow progress to be measured and mapped across the years of school. For example, a student whose achievement is assessed as ‘Limited’ in each of Years 3, 5, 7 and 9 is almost certainly developing steadily higher levels of science knowledge and understanding across these six years of school. But this system makes it difficult to describe with precision what a student knows in science at any given time and impossible to quantify the student’s progress over time...

The Queensland Studies Authority also has developed Queensland Comparable Assessment Tasks (QCATs) in English, Mathematics and Science at Years 4, 6 and 9... Teachers judge and report the quality of their students’ responses to each QCAT using five grades, A to E. Once again, these grades do not provide a basis for monitoring student growth in science (or any other key learning area) across Years 4 to 9 and do not provide precise information about what students know and understand in science at any given time. (QEPR Report, 2009, 81-2)

On its website, the Queensland Studies Authority provides ‘sample assessment bank items’. One of these is a student assessment booklet based on food webs (Year 7 Science). The booklet contains fifteen separate exercises that students are to complete. Each student’s responses to the booklet are then graded A to E using a provided ‘guide to making judgements’ (Figure 4.1). As can be seen from Figure 4.1, the awarded grades are based on distinctions that teachers make – for example, between students who draw ‘well-justified conclusions’ and students who draw ‘considered conclusions’, and between students who ‘generally draw plausible conclusions’ and students who ‘occasionally draw valid conclusions’. While assessments of this kind may be useful for classroom purposes, they do not provide a comprehensive picture of what individuals know, understand and can do in science, and they do not provide a basis for monitoring a student’s progress in science over time.

In contrast, the kind of resource envisaged by the QEPR report was a resource that teachers and schools could use to measure individuals’ levels of science knowledge and understanding at various stages in their schooling and so evaluate their performance against year level expectations and monitor their developing knowledge and understandings in science over time.

The QEPR report used NAPLAN tests as an example, but the feature of NAPLAN that was being recommended was not its mandatory nature, but its use of a set of ‘standard’ tests that have been statistically calibrated (using the Rasch measurement model), enabling a hierarchy of achievement levels to be described and illustrated, students’ performances to be compared with year level expectations (‘minimum standards’), and individual progress to be monitored across the years of school.

A	B	C	D	E
Identifies 4 living things that function as a producer, herbivore or carnivore			Identifies 2 living things that function as a producer, herbivore or carnivore	Identifies 1 living thing that functions as a producer, herbivore or carnivore
Identifies 2 appropriate food chains from the food web.		Identifies the producer for both food chains and completes 1 chain.	Identifies 1 food chain and sections of the other.	Identifies sections of both food chains.
Consistently draws well-justified conclusions.	Consistently draws considered conclusions.	Generally draws plausible conclusions.	Occasionally draws valid conclusions.	Rarely draws valid conclusions.
Analysis leads to skilful representation of the data with a complete food web structured according to the feeding hierarchy.	Analysis leads to accurate representation of the data with a complete food web and an easily discerned feeding hierarchy.	Analysis leads to proficient representation of the data with a food web that contains isolated pieces of data and/or partially completed food chains.	Analysis leads to representation of obvious feeding relationships.	Analysis leads to isolated representations of some feeding relationships.

*Figure 4.1 Guide to making A-E judgements, Year 7 Student Booklet (food webs)*

Since the release of the QEPR report, ACER has completed a 2-year project to produce a set of science tests that illustrate the kind of classroom resource that the QEPR report was recommending. The Progressive Achievement Tests (PAT) in Science complement the PAT Reading (4<sup>th</sup> Edition) and PAT Maths (3<sup>rd</sup> Edition) tests that are now widely used as classroom resources in Australian schools.

PAT Science consists of eight science tests for use in Years 3 to 10. Each test is appropriate for use in two or three adjacent year levels. Tests 1 to 4 are 30-minute tests; tests 5 to 8 are 40-minute tests

The eight tests have been developed to address a curriculum framework constructed from a detailed analysis of the science frameworks of all Australian states and territories. The PAT Science manual shows how each item on the tests maps to the science framework in each state and territory. The first edition of PAT Science also was informed by the National Science Curriculum Framing Paper.

PAT Science includes items addressing four broad areas of science learning: physical systems (e.g., energy and change), chemical systems (e.g., materials), geological and space systems (e.g., earth and space), and living systems (e.g., life and living). The processes of science, which include knowledge about the culture of science and its impact on society, form a fifth area.

The tests consist of both multiple-choice (see Figure 4.2) and short-answer questions designed to test a student’s knowledge of science facts and processes and their ability to apply scientific understandings. The short-answer questions

are provided to illustrate how written responses can be used by teachers to explore students' understandings of scientific phenomena.

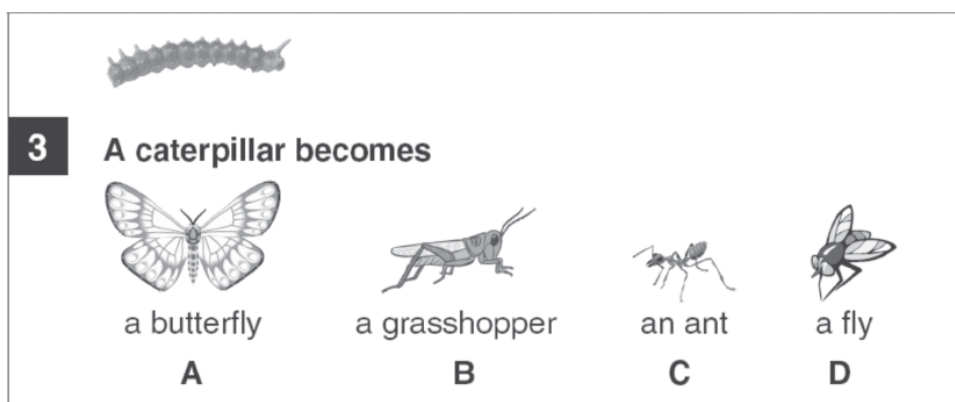


Figure 4.2 PAT Science item (Year 3 – very easy)

The PAT Science items are similar in format to the TIMSS items that a sample of Queensland Year 4 and Year 8 students will take later this year.

**RECOMMENDATION**

That standard science tests be introduced at Years 4, 6, 8 and 10 *for school use* in identifying students who are not meeting year-level expectations and for monitoring student progress over time.

## 5 Supporting and Developing School Leaders

The QEPR report noted that a striking feature of the high-performing schools visited as part of that review was the strength of the school leadership. In each of the high-performing schools visited, the principal had been in place for a number of years, had built the tone and ethos of the school over time, had high expectations of teachers and students and had put in place an effective leadership team with a shared commitment to continuous improvement. What these schools had in common were strong leaders with a determination to improve outcomes for *all* students. An important conclusion of the QEPR review was that a key to raising levels of literacy, numeracy and science achievement in Queensland primary schools was to ensure that every school had strong and effective school leadership.

### QEPR Recommendation 5

A conclusion of the QEPR report was that increased attention to the professional development of school leaders – particularly in leadership behaviours known to be associated with improved student outcomes – was likely to be an effective strategy for raising levels of literacy, numeracy and science achievement in Queensland primary schools:

#### QEPR Recommendation 5

That the Queensland Government initiates an expert review of international best practice in school leadership development with a view to introducing a new structure and program of advanced professional learning for primary school leaders focused on effective strategies for driving improved school performances in literacy, numeracy and science.

### 5.1 Initiatives and Progress

Since the release of the QEPR report, at least three initiatives have been taken which have the potential to build the strength of school leadership in Queensland:

- the establishment of the Queensland Educational Leaders Institute (QELI);
- the successful joint bid to host the Australian Institute for Teaching and School Leadership (AITSL); and
- the introduction by Education Queensland of the Teaching and Learning Audit of all government schools.

#### **Queensland Educational Leaders Institute**

In its response to QEPR report the Queensland Government announced that it would establish a new Queensland Education Leadership Institute (QELI) for school leaders:

The education leadership institute will coordinate advanced professional learning programs for school leaders and aspiring school leaders from state, independent and Catholic schools. The programs will focus on educational leadership of school improvement and schools system priorities, including the teaching of literacy, numeracy and science. They will serve the needs of school leaders across their career stages and school environments. (Department of Education and Training, 2009b)

The Government appointed an expert committee to drive the development of the Queensland Education Leadership Institute, with a provisional launch date of July 2010. The committee has involved key stakeholders, including representatives from the schooling sectors, universities, and principals' associations.

The decision was made to establish QELI as a not-for-profit company limited by guarantee owned jointly by the State Government, Independent Schools Queensland and the Catholic Education Commission. The Bligh Government has committed \$3.6 million to establish the Institute:

In partnership with universities, the Catholic and Independent sectors and principals' associations, the department will progress the establishment of a Queensland Education Leadership Institute (QELI) which will have a virtual and physical presence across the State with headquarters in a central Brisbane location. QELI will develop the skills, knowledge and behaviour of current and aspiring leaders, middle managers and specialist teachers across the Queensland schooling sectors and provide these staff with ongoing school leadership support to bring about significant school improvement and reform based on:

- building a school culture of high expectations;
- setting targets for improvement;
- analysing and monitoring school performances;
- recruiting and retaining outstanding teachers;
- building existing staff and leadership capacity;
- managing multiple demands on leaders' time; and
- effectively allocating physical and human resources to improve learning.

(Queensland Budget 2009-10)

It is understood that lease negotiations are underway to co-locate QELI and the Australian Institute for Teaching and School Leadership at a South Brisbane location, adjacent to the South Bank education and cultural precinct.

### **Australian Institute for Teaching and School Leadership**

The decision to establish a new Australian Institute for Teaching and School Leadership (AITSL) was made by MCEECDYA at its meeting in September 2009:

Ministers today agreed to the establishment of the Australian Institute for Teaching and School Leadership (AITSL) to provide national leadership for the Commonwealth, state and territory governments in promoting excellence in the profession of teaching and school leadership. It will take responsibility for rigorous national standards and for fostering and driving high quality professional development for teachers and school

leaders, working collaboratively across jurisdictions and engaging with key professional bodies. The roles of the new Institute will be to:

- develop and oversee a set of national standards for teaching and school leadership and implement an agreed system of national accreditation of teachers based on these standards; and
- promote excellence and national leadership in the professional development of teachers and school leaders.

States and territories were invited to submit proposals for establishing and locating the new Institute and MCEECDYA agreed at its meeting in November 2009 that the Institute would be co-located in Brisbane and Melbourne.

The Letter of Expectation for 2009-10 provided by the Deputy Prime Minister to the Directors of AITSL makes clear the role that AITSL is expected to play in relation to the development of national standards for school leaders. At their meeting in March 2009, the Directors agreed to undertake a review of existing standards and frameworks for school leaders as the first stage in developing national professional standards for school leaders and at their meeting in May 2009 noted that further work was required around issues such as the scope of the standards, their purposes, the need to consider both current and aspirant school leaders, the link between professional learning and professional standards, and the possible use of leadership standards for certification.

### **Teaching and Learning Audits of all government schools**

As part of its ongoing efforts to improve students' literacy and numeracy levels, the Queensland Government introduced new audit requirements for state schools during 2009. In announcing the new requirements, the Department linked the new audit system to the findings and recommendations of the QEPR report. The Australian Council of Educational Research was engaged to develop the audit tool and a stakeholder reference group was established to provide feedback on the tool as it was developed and trialled in a sample of schools at the end of term 4 2009.

The new audit process is being implemented in all Queensland state schools in 2010. The basis of the audit is a teaching and learning audit framework consisting of eight domains relating to key curriculum, teaching, learning and assessment practices in schools. Each school is rated low, medium, high or outstanding on each of the eight aspects. The framework (audit 'tool') is designed to assist schools as they monitor their practice to ensure a focus on continuous improvement. A total of 21 auditors are conducting the audits in schools during the 2010 school year.

## **5.2 Comments and Recommendations**

The establishment of the Queensland Educational Leaders Institute, the co-hosting of the new Australian Institute for Teaching and School Leadership, and the introduction of the teaching and learning audit of all state schools during 2010 represent a very good start towards the QEPR intentions of a 'new structure and program of advanced professional learning for primary school

leaders focused on effective strategies for driving improved school performances in literacy, numeracy and science'. All three initiatives are at very early stages of introduction, but together they have the potential to make a significant contribution to the support and development of school leaders.

The newly introduced audit tool provides a particularly promising framework for leadership development because it has the potential to focus the development of school leaders on practices that are known to be important in improving teaching and learning.

Many leadership frameworks, professional standards and leadership development programs take as their starting point *generic* leadership skills and attributes. Many also attempt to address the full breadth of management and leadership work. There is a place for frameworks and programs of this kind, but the advantage of focusing professional learning on the eight domains of the audit framework is that leadership learning is concentrated in areas that are most likely to lead to improvements in the quality of teaching and learning in schools.

In terms of Education Queensland's *Leadership Matters* framework for principals, the audit tool focuses attention on the central leadership capability: Educational Leadership:

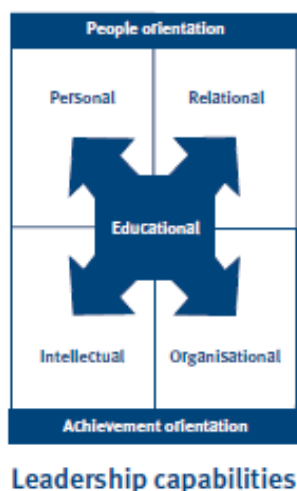


Figure 5.1 Leadership Matters capabilities

The other leadership capabilities,

- *personal* (inner strengths and qualities that underpin ethical and professional practice)
- *relational* (interpersonal skills required to develop and maintain quality relationships with a diverse range of people)
- *intellectual* (clever thinking, reasoned judgement and wise decision making)
- *organisational* (effective management of human, financial and resources)

are perhaps best thought of as enabling capabilities. It is not always clear what leaders need to *do* to develop in these areas (e.g., self-awareness, resilience, emotional maturity, honesty, sensitivity, wisdom). It is also less clear how leaders could be developed or validly assessed in some of these areas.

On the other hand, the Teaching and Learning Audit tool provides a clear framework for thinking about a leader's work and ways in which leadership knowledge, skills and practices might be further developed. In the current national context in which AITSL is reviewing various leadership standards and frameworks and their links to improved teaching and learning, Education Queensland is in an excellent position to use its audit tool as a basis for conceptualising and describing *educational* leadership (i.e, leadership of the core work of schools).

Given the Department's successful introduction of the Teaching and Learning Audit Tool in Queensland state schools during 2010, and the focus that is now being placed on the eight domains of the tool in schools, consideration might be given to using this framework as a basis for professional learning programs for state school leaders. Again, there may be interest in programs of this kind beyond Queensland state schools. For example, it is noted that QELI has been established with a brief to develop school leaders' abilities to achieve 'significant school improvement and reform' and, at the national level, one of the intentions of AITSL is to 'empower school leaders with strategies that support excellence in teaching in their schools'.

**RECOMMENDATION**

That consideration be given to using the eight domains of the Teaching and Learning Audit tool as a basis for developing and implementing professional learning programs for school leaders.

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## Appendix

### Module Requirements

Modules offered within the FAPD must meet the following seven criteria.

#### 1 Content

Modules developed under the FAPD must:

- 1.1 address a coherent and substantial selection of the professional development outcomes for one of literacy, numeracy, science or assessment capability. These specifications are provided as:
  - *Literacy* professional development outcomes in the content areas of reading and writing, literacy pedagogical content knowledge and assessment that are relevant to teachers and school leaders during different phases of their professional development.
  - *Numeracy* professional development outcomes in the content areas of number, algebra, measurement, geometry and statistics and probability; numeracy pedagogical content knowledge; and assessment that are relevant to teachers and school leaders during different phases of their professional development.
  - *Science* professional development outcomes in the content areas of ways of working, science as a human endeavour, earth and beyond, energy and change, life and living and natural processes and materials; science pedagogical content knowledge and assessment that are relevant to teachers and school leaders during different phases of their professional development.
  - Professional development outcomes relating to *assessment* capability that can be applied in any learning area.
  - Professional development outcomes for school leaders to lead, manage and support quality curriculum and whole school planning, focussed teaching and monitoring in priority areas of literacy, numeracy, science and assessment capability.
- 1.2 address the needs of participants at the foundational, proficient, highly accomplished or lead phase of teacher development, or those in school leader roles.
- 1.3 reflect an appropriate balance of outcomes from each area of content, pedagogical content knowledge and assessment.
- 1.4 draw on and familiarise participants with evidence from research and best practice.

#### 2 Teaching and learning approaches

2.1 Modules developed under the FAPD must:

- be based on adult learning principles
- provide opportunities for teachers and school leaders to reflect on their current practice
- have a significant practice based component that requires participants to explore the content of the module in their own school setting
- promote collaborative learning
- ensure relevance to participants with different backgrounds.

### **3 Assessment and module completion**

3.1 Modules developed under the FAPD must:

- have defined assessment requirements
- include assessment activities that require participants to examine and reflect on the content of the module in the context of their own school
- include assessment activities of a standard suitable to provide the basis for articulation and credit transfer with post graduate qualifications in education
- model self, peer and collaborative approaches to assessment
- clearly identify what constitutes completion of a module and the certification to be issued to participants.

### **4 Format of modules**

4.1 Modules developed under the FAPD must:

- be approximately 50 hours of learning time in duration. Learning time includes the time allotted to instruction, independent study, reflection on practice, and assessment
- include a clear statement of rationale and learning outcomes linked to the QCT specified professional development outcomes
- provide a supporting statement detailing learning approaches and activities, resources and assessment strategies.

### **5 Professional Standards for Queensland Teachers**

Modules developed under the FAPD must:

- 5.1 align with the QCT's *Professional Standards for Queensland Teachers* and the *Continuing Professional Development Framework* for renewal of registration
- 5.2 include a clear statement that makes explicit the links between the module and the *Professional Standards for Queensland Teachers*.

### **6 Delivery modes**

Modules developed under the FAPD must:

- 6.1 incorporate flexible delivery options to enable participants to access the modules in remote, regional and metropolitan areas. Professional learning modules should be supported by a variety of resources and approaches such as podcast and presentation packages with linked readings, selected resources with discussions, response to case studies, engagement in action learning cycles, mentoring and guided review and reflection.

### **7 Articulation and credit transfer**

Modules or packages of modules developed under the FAPD must:

- 7.1 identify any arrangements for advanced standing or accreditation towards a further qualification or
- 7.2 provide an explanation as to why credit transfer arrangements have not been established.