Critical and creative thinking in the new Australian Curriculum
Part One

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Biography

Leonie McIlvenny has been an educator for 30 years. Initially a primary school teacher, then teacher librarian, Leonie has taught in both primary and secondary schools in the public and private sector in Western Australia. During her career, she has been a curriculum consultant, online course developer, library consultant and ICT project manager for the Western Australian Education Department and university lecturer. More recently, Leonie developed the ***Learning to Learn*** *Program at Aquinas College. She is an instructional designer at Curtin University and head of the iCentre at Iona Presentation College Perth. Her interest in information literacy was the driver behind the development of* ***Studyvibe*** *and* ***Countdown to Crunchtime****, two study websites to support high school students. Another website* ***Making Metacognition Mainstream*** *explores critical and creative thinking in the new Australian Curriculum.*

Introduction

While there are many models and theories that have been developed to help describe and teach 'thinking skills' (for example, Marzano 1988; Perkins 1985; Swartz & Parks 1994), *critical and creative thinking* appear to be approaches widely accepted in today's educational arena. Consider: The **Melbourne Declaration on Educational Goals for Young Australians** (MCEETYA 2008) recognises that *critical and creative thinking* are fundamental to becoming successful learners. The new **Australian Curriculum** explicitly identifies *critical and creative thinking* as essential competencies to be addressed within the General Capabilities (Australian Curriculum Assessment and Reporting Authority 2011). The **International Society for Technology in Education** (ISTE) identifies *Critical Thinking and Creativity and Innovation* as two of six domains in their NETS-S for students (the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world) (ISTE 2000). The **Partnership for 21st Century Skills** also identifies *Critical Thinking and Creativity* as two of the 4Cs in the Learning and Innovation Skills Domain of the 21st Century Student Outcomes and Support Systems (Partnership for 21st Century Learning Skills 2010).

These key initiatives and internationally recognised frameworks are strong proponents of critical and creative thinking as fundamental skills to be taught to students in a progressive, sequenced development. It is now no longer possible, therefore, for schools to merely pay lip service to or ignore the strategic placement of these skills within the curriculum.

For the first time we have a national curriculum that not only explicitly identifies and names these skills but also ensures they are embedded across all learning areas from Foundation to Year 10. In the past schools selected or generated their own models, approaches and scope and sequence of skills. This was sometimes a hit-and-miss, ad hoc approach where the teaching of these skills depended upon the availability of staff who had an interest or expertise in this area or whether thinking skills became one of the curriculum priorities in the school. Therefore, while some schools had dynamic programs, others provided little or no explicit teaching of these skills.

The Australian Curriculum (hereafter Curriculum) now provides a mechanism by which all schools can ensure that these skills are explicitly taught to all students. The high-profile placement of *Critical and Creative Thinking* as a General Capability reflects the importance that is being placed on this learning domain. This is further reinforced through the comprehensive support resources provided through the Scope statement, **Organisational Framework** (Figure 1) **and Learning Continuum**. The theory from which this General Capability has been developed is also articulated in a research-based rationale (Critical and Creative Thinking PDF) (Australian Curriculum 2012).

Unpacking the Critical and Creative thinking General Capability

There are four aspects of the *Critical and Creative Thinking General Capability* that require a comprehensive interrogation to fully understand the parameters by which these skills are to be addressed in the Curriculum.

1) The **Scope of Critical and Creative Thinking** provides a generalised statement about what constitutes these thinking skills and describes the

Table 1 The Scope of Critical and Creative Thinking © Australian Curriculum, Assessment & Reporting Authority 2011

Types of thinking	Definition	Examples
Critical thinking (Divergent thinking)	Students recognise or develop an **argument**, use **evidence** in support of that argument, **draw reasoned conclusions**, and use **information to solve problems**.	interpreting, analysing, evaluating, explaining, sequencing, reasoning, comparing, questioning, inferring, hypothesising, appraising, testing and generalising.
Creative thinking (Convergent thinking)	Students learn to **generate and apply new ideas** in specific contexts, see **existing situations in a new way**, identify **alternative explanations**, and see or make new links that **generate a positive outcome**.	combining parts to form something original, sifting and refining ideas to discover possibilities, constructing theories and objects. Products include complex representations and images, investigations and performances, digital and computer-generated output
Metacognition	Monitoring, evaluating and revising own thinking	Being able to describe their thinking processes and evaluate their effectiveness. Thinking about their thinking Reflecting

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behaviours that students should typically demonstrate. It also suggests strategies and pedagogical approaches that will assist in their development (Table 1).

2) The **Organising elements** of the *Critical and Creative Thinking General Capability* have been deconstructed into four interrelated domains (Figure 1). These four domains have then been further broken down to identify specific skills such as reasoning, hypothesising, theorising and so on.

- **Inquiring** — identifying, exploring and clarifying information
- **Generating innovative ideas** and possibilities
- **Analysing, synthesising and evaluating** information
- **Reflecting on thinking**, actions and processes.

Figure 1 The Organisational Framework of the Critical and Creative Thinking General Capability
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3) **The Learning Continuum**

The Learning Continuum elaborates the four organising elements described above to create a scope and sequence of six levels of achievement. This also provides a benchmark for schools to map the skills across year levels.

Level 1 — end of Foundation Year
Level 2 — end of Year 2
Level 3 — end of Year 4
Level 4 — end of Year 6
Level 5 — end of Year 8
Level 6 — end of Year 10

Layered beneath the learning continuum are links to examples describing what the thinking skill looks like in various learning area contexts at specific year levels (Table 2).

Table 2 The Learning Continuum © Australian Curriculum, Assessment & Reporting Authority 2011

Inquiring – identifying, exploring and organising information and ideas

Level 4 Typically by the end of Year 6, students:	Level 5 Typically by the end of Year 8, students:
Pose questions pose questions to clarify and interpret information and probe for causes and consequences Show examples	**Pose questions** pose questions to probe assumptions and investigate complex issues Show examples
Identify and clarify information and ideas identify and clarify relevant information and prioritise ideas Show examples	**Identify and clarify information and ideas** clarify information and ideas from texts or images when exploring challenging issues Show examples
Organise and process information analyse, condense and combine relevant information from multiple sources Show examples	**Organise and process information** critically analyse information and evidence according to criteria such as validity and relevance Show examples

For example:
Organisational element: Inquiring — identifying, exploring and organising information
Level 5 (typically by the end of Year 8)
Thinking Skill — **Pose questions** — students pose questions to probe assumptions and investigate complex issues.
Show examples — This links to a range of subject-based examples within the content descriptors.
For example, **Science example** — identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (Science Inquiry).
History example —identify a range of questions about the past to inform a historical inquiry.

4) **Applying a filter of Critical and Creative thinking within the subject curriculum content**

Another way to identify critical and creative thinking within each content area is to apply a filter when examining specific learning area content descriptors and elaborations. The filter allows you to see only those outcomes that have been tagged as addressing the chosen parameter(s) — in this case *critical and creative thinking*. (Filters can also be applied by year level, strand, cross-curricular priorities and General Capabilities.)

Developing a program — from theory to practice

With the explicitly stated *General Capabilities of Critical and Creative Thinking* articulated in the Curriculum there is now an imperative to ensure these skills, competencies and predispositions will be developed in a more systematic, developmentally appropriate way. The challenge will be to take the four organising elements and translate them into pedagogical practices in the classroom.

Don't throw the baby out with the bath water

While this new theoretical framework may differ from what you are familiar with, the processes articulated within each element are not new (we are all familiar with the skills of hypothesising, synthesising, reflecting, questioning, inquiring and so on). We do not have to disregard what we have used in the past (especially if it has been a useful tool or pedagogical approach)

Table 3 Critical and Creative Matrix

Critical and creative thinking organising elements from the Curriculum	Bloom's Taxonomy	The Inquiry process	Habits of mind	Frameworks/tools/instructional strategies
Inquiring, identifying, exploring and clarifying information	Remember Understand	Defining Locating Selecting	• Questioning and posing questions • Gathering data through all the senses • Applying past knowledge • Striving for accuracy • Thinking and communicating with clarity and precision	The Information Process Big Six Mindmapping Six Thinking Hats Y chart Thinkers Key
Generating innovative ideas and possibilities	Create	Defining Organising and synthesising	• Creating, imagining and innovating • Thinking flexibly • Taking responsible risks • Persisting • Remaining open to continuous learning	Mindmapping Scamper Thinker's Keys Question Matrix 5Ws Decision making matrix SWOT analysis Random Input Lateral Thinking
Analysing, synthesising and evaluating information	Synthesis Analysis Evaluate	Organising and synthesising	• Applying past knowledge • Striving for accuracy • Thinking interdependently • Thinking about your thinking • Persisting	Six Thinking Hats Graphic Organisers CORT Thinking Scamper
Reflecting on thinking, actions and processes	Evaluate	Evaluating	• Thinking about your thinking • Thinking interdependently Thinking flexibly • Applying past knowledge • Managing impulsivity	KWL PMI Six Thinking Hats SWOT Analysis

but what is now required is a reframing or reorganising of these skills, resources, tools and processes to align with this new framework.

Table 3 is designed to springboard your own reframing of existing strategies and resources in the development of a school-based matrix. It is not comprehensive but merely a starting point.

Where to from here?

For those schools that have already developed and implemented some form of 'thinking curriculum', the process of aligning what they have in existence to the new Curriculum should not be an onerous task. It does, however, provide an opportunity to review and refine existing programs against national standards.

For those schools that do not have a structured 'thinking curriculum' there is now an opportunity (and imperative) to interrogate the *Critical and Creative Thinking General Capability* to inform and guide their future curriculum planning in this area.

Here are some questions to start with:

- What are we already doing in our school to develop/promote critical and creative thinking? (Audit)
- How well are we doing it? (Review)
- How well does it align with the skills and capabilities articulated in the *Critical and Creative thinking General Capability?* (Comparison)
- How effective are the models, frameworks and tools we are using in supporting the development of the thinking skills that have been articulated in the Australian Curriculum? (Audit/Review)
- How will we explore new ways of developing these skills (especially in light of the transformational way technologies can assist in student learning)? (Exploration/Research)
- Who will be responsible for teaching these skills? (Staff Profiling)
- How are these skills going to be embedded into the Curriculum delivery? (Curriculum Planning)
- What will the teaching/learning program look like? (Pedagogy Review)
- How will these thinking skills be assessed? (Curriculum Planning/ Review)
- Where will these skills be taught? (Strategic Planning/Curriculum Mapping)
- How are we going to ensure that teachers receive the professional development they require to engage with these new pedagogies? (Professional Development)?
- What model(s) are we going to adopt for the implementation of the *Critical and Creative Thinking General Capability?*

Ways of implementing critical and creative thinking in schools — models of practice

In the past, there have been a number of approaches to developing a 'thinking curriculum' in schools, some more comprehensive than others.

Approaches have included:

- An explicit program that sits 'outside' the subject-based curriculum (for example, *Learning to Learn*, PEAC, Inquiry Learning, Scamper).
- A whole school program where the skills are strategically embedded into the curriculum and written into programs *(Mapped curriculum).*
- Individual teachers who champion the teaching of thinking skills in their own classroom but there is little or no transference to other subjects.
- Agreed upon *frameworks and tools* are used to create a *common language* but not necessarily mapped or assessed (for example, The Inquiry Process used as the framework for research throughout the school, *Habits of Mind*, Bloom's Taxonomy, Scamper, a

standard graphic organiser repository used by all students in the school).

Even though we now have a clearly mapped approach to developing thinking skills, aspects of each of these models are still relevant and should not be discounted without due consideration.

A journey of a thousand miles always starts with the first step (Lao Tzu).

If your school has decided to 'take on' the challenge of implementing the General Capability of *Critical and Creative Thinking* or are reviewing your existing program, then the following steps guide may your planning:

1. Become familiar with where *critical and creative thinking* are articulated in the Australian Curriculum. (General Capabilities, Organising elements, Learning Continuum, Subject-specific Content Descriptions and Elaborations.)
2. Apply the *filters* to identify within each learning where critical and creative thinking are explicitly described. Map the skills across your curriculum.
3. Develop a *common understanding and language* across the school about what is meant by critical and creative thinking.
4. Overlay the *critical and creative thinking skills* identified in the *Learning Continuum* with the existing school curriculum. What are you already doing? Where are the gaps?
5. Identify the school's *existing programs* (for example, Learning to Learn, problem-based learning), frameworks (for example, Habits of Mind), processes (for example, The Inquiry Process) or taxonomies (Bloom's Taxonomy) that can be applied to this dimension of the Curriculum.
6. *Map* these resources and *approaches* to those in the *Learning Continuum*.
7. Make a decision about which existing resources and approaches still serve and explore new opportunities and resources.
8. Develop an *implementation plan* that articulates the Who? What? Where? And When? of the development of this General Capability. For example, will this General Capability be addressed across all learning areas and year levels simultaneously or will it be phased in over a period of time, perhaps starting with one learning area and year group program?
9. Research new pedagogies that will assist in the development of these skills (these pedagogies have arisen out of the powerful opportunities through a range of technologies).
10. Explore the wealth of resources that are now being developed to support the implementation of the new Curriculum. Include the resources that were developed by the Teaching Teachers for the Future Project (2012) and Scootle (2012) as an initial starting point.

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Summary and conclusion

This paper (part one in a series) has only hinted at what is required to fully embrace the concept of a 'thinking curriculum'. It was necessary, I believe, to start with the Australian Curriculum, as this is the key driver for all educational programs in all Australian schools. It does not discount or undervalue in any way what schools may have done in the past or may currently be doing with regard to teaching thinking skills. It is, however, the perfect time to review current practices, revise programs, frameworks and resources, align existing programs with the new *critical and creative thinking learning continuum* and research new learning theories, pedagogies and practices.

The next paper will explore the affordances that technologies bring to the development of critical and creative thinking, particularly in the context of inquiry learning.

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