

## ***Fanning the flames of wonder***

The title of my talk, “Fanning the flames of wonder”, is in honour of my Year 12 Maths teacher, Kevin Garrity, who used to wander round our classroom, while we trying to solve the tricky calculus problems he’d set us, fanning us with a wad of paper. One day I asked him what he was doing, and he answered, “Fanning the flames of wonder!”

That strikes me as an inspiring description of what teachers do, and I am very pleased and privileged to have been asked to address this conference – for teachers and by teachers – on the subject of the Australian Curriculum and General Capabilities.

I am going to start and end this presentation with Seamus Heaney’s poem, “The Settle Bed”. The settle bed of the title is a piece of furniture that is an heirloom, “an inheritance”, handed down from generation to generation in the speaker’s Irish family.

Willed down, waited for, in place at last and for good.  
Trunk-hasped, cart-heavy, painted an ignorant brown.  
And pew-strait, bin-deep, standing four-square as an ark.

The settle-bed is a metaphor for the world into which we are born. We have no choice about that. It is just a “given”. Data, if you will, that we experience and have to make sense of as we grow and learn. Hold that thought. We will return to it.

Greg sent me an email suggesting certain topics for me to cover. I’ll quote the email: “Obvious topics would include the future of NAPLAN and the Australian Curriculum. Alternatively, it would be great to hear David speak about the views he has recently expressed about the relationship between constructs such as critical thinking and domain specific knowledge and how we need to bridge the divide between the different sides of the debate on this issue.” Those views were expressed in an interview I did with Rebecca Urban from the Australian, and I am very pleased to see that Rebecca is attending this conference today.

I replied to say that I was happy to speak about all three topics, as they are interlinked. But in doing so I will also make reference to the philosophical thought of Bernard Lonergan, and the Review of the Melbourne Declaration, before concluding with some remarks about the purpose of education.

**So, first, and briefly, the future of NAPLAN.** I will leave discussion of issues related to the transition to NAPLAN online to Paul Monk who is talking this afternoon. Rather I’d like to address some of the other issues that have been raised about NAPLAN recently.

Why do we focus on the two general capabilities of literacy and numeracy when it comes to nationwide standardised testing? Very simply, because they are fundamental to further learning and to being able to participate effectively in society and, in the words of Nobel prize-winning economist, Amartya Sen, living lives we have reason to value. Sen pioneered the capability approach to development economics, and defined a capability as “practical choice”, that is the ability to exercise agency in the pursuit of one’s goals. If we are not literate and numerate, the range of practical choices open to us is severely constrained.

What is concerning is that in the ongoing conversation about how education should evolve to take account of its changing context, some well-meaning advocates for reform are downplaying the importance of literacy and numeracy. For example, in an article entitled “Towards Education 3.0: The Changing Goalposts for Education” Chris Goldspink & Robert Kay write about the brave new world of artificial intelligence and ask:

“What does this mean for education? Are the traditional goalposts of the 3Rs still appropriate and if not, what should they be? How can schooling prepare children to thrive in the non-routine cognitive roles it appears will make up the bulk of the future workforce? Of more concern is that if we need to change the education system to properly address these issues, we don’t have much time.”

While the football field analogy is useful, describing literacy and numeracy as the goalposts is wrong. They are not the goalposts, rather they are the gateway onto the field. Without literacy and numeracy you don’t get to play at all. You don’t get to be included in the game. You don’t get to make the choices you’d like to be able to make about what to learn next, what career to follow. You are excluded. That is why we need to ensure all our children, particularly those who are most likely to be excluded from the life of society due to other circumstances, are empowered to make practical choices about their lives through education. That is why we need to know, and why parents have a right to know, how our school system is performing in delivering for those children. That is why both NAPLAN and My School are necessary.

However that is not to say they cannot be improved. As you know, Professor Bill Louden has provided a report to Education Ministers on how to improve the MySchool website by reducing the number of NAPLAN displays and focussing attention more on student gain than on comparisons with statistically similar schools. Council will soon be considering specific options for responding to Professor Louden’s report.

NAPLAN itself is also likely to be reviewed once transition to the online environment is completed, now scheduled for 2021. Some issues that have been flagged with us by stakeholders that might

need to be looked at include how writing is assessed, whether texts used in the reading assessments could be more explicitly linked to the knowledge content of the curriculum, and the extent to which the teaching profession is involved in the development of the measurement framework and test items.

Some stakeholders have suggested that one day NAPLAN could be replaced by the online, on-demand formative assessment tool whose feasibility is currently being investigated as part of the National School Reform Agreement, and about which Dr Jenny Donovan will have more to say this afternoon. I doubt this will be case, for the simple reason that NAPLAN serves a very different purpose, a purpose for public accountability and reporting to parents and the broader community, that genuine formative assessment does not serve. So the future of NAPLAN is one of evolution rather than extinction.

**On the future of the Australian Curriculum**, again we are looking at evolution, as opposed to revolution, despite earnest advocacy from some quarters that substantial change is needed. Just this week, for example, Jan Owen from the Foundation for Young Australians said while the Australian Curriculum undergoes reform, it is not keeping pace with contemporary realities and student needs. The criticism of the curriculum is focussed on its year level structure, with references to it representing an apparently out-dated, so-called “industrial model” of schooling that treats children as sausages moving through a sausage machine.

The AC has only relatively recently been implemented nationally, and there appears to be little appetite from states and territories and major stakeholder groups for significant change. However that does not mean there is no scope for refinement, and Ministers have asked us to report to them by the middle of next year on what that scope might be.

To that end, this year as part of our regular information gathering from jurisdictions and from the Catholic and Independent sectors about how they are implementing the AC, we also asked for suggestions on this question of scope for refinement. In particular, we are interested in the issues of essential content and the place of the general capabilities, which are not unrelated of course. We are waiting to get those responses back before determining next steps in the process of developing advice to Ministers.

**Which brings me to the issue that I suspect Greg was particularly keen to hear from me about, namely the relationship between knowledge of discipline-specific facts and general capabilities such as creative and critical thinking.**

Rebecca’s article was based on her interview with me that included the following sentences:

“When people say we need to cut back on the breadth of the curriculum and develop skills, people might misinterpret that as saying content knowledge is not important.”

“They are not in opposition. They are complementary. It is difficult to teach a discipline and cover content knowledge without imparting skills and it’s impossible to teach skills without teaching children content knowledge.”

“My general approach in complex education debates, which often unfortunately collapse into people taking entrenched positions via Twitter, is to attempt to build bridges between sides, as opposed to taking sides.”

So this morning I will attempt to build some bridges. However, in doing so, I would like to start by urging us all to recall the prayer of St Francis of Assisi, in which he asked for the grace that he may understand, rather than be understood. Effective dialogue requires us first to **be attentive** to what others have to say and then do our best to **understand** what they are saying, rather than rushing to **judgement** based on what we *think* they might be saying. These notions of attentiveness, understanding and judgment are themselves central to critical thinking itself.

There are basically two broad schools of thought about the discipline-specific knowledge versus general capabilities duality. Both affirm, correctly, that knowledge and capabilities go together and can’t be taught in isolation from each other.

One approach - let’s call it more traditional - privileges knowledge, arguing that capabilities will be learnt along the way as part of effective and explicit teaching of that content by teachers who are able to impart their knowledge in ways that engage the students effectively in capability development as well.

The other approach – let’s call it less traditional - privileges the general capabilities, but content knowledge is still necessary because it provides the context within which the capabilities are learnt.

This second approach is **theoretically** agnostic as to which content should be selected to play the role of context for capability development. So, **at the extreme**, this approach might suggest that, for example in history, studying the changes to animal husbandry techniques in Mongolia could be just as good as studying the causes of World War One when it comes to imparting the skills of analysing primary and secondary sources and making judgements about the nature of evidence to support or debunk particular historical theories.

However, I cannot imagine anyone, not even the most ardent advocates for content-as-context for skills, seriously advocating that some knowledge of World War II, in particular of the Holocaust – its causes and consequences – should not be taught at school in a nation that purports to live by democratic values.

The same goes for the focus in Australian history on the Aboriginal experience of contact with European settlers, and the subsequent 200 years of consequences for their descendants.

There are some things that just need to be known if we are to be part of a community, as opposed to atomised individuals whose primary purpose in life is to earn money in order to spend money. These things are essential knowledge for being someone who is culturally literate, to borrow a phrase from E.D. Hirsch.

I am convinced that all involved in education know this, and so demonising advocates for skills development on this basis - that they don't believe that certain content knowledge is essential - is attacking a straw man.

A middle way between the Scylla of just focussing on factual knowledge and the Charybdis of just focussing on general capabilities is to strike the right balance between the amount of essential knowledge to be covered on the one hand with more opportunities for diving more deeply into that essential knowledge in a way that allows for capabilities such as critical and creative thinking in that discipline to be developed more intentionally.

Now, when it comes to the question of whether skills such as creative and critical thinking and problem solving learnt in one discipline can be easily transferred to another discipline, again we find two schools of thought, one better supported by the evidence than the other. The evidence appears much stronger for the proposition that these skills are not transferrable. Just because an expert engineer will be able to solve the problem of how to build a bridge in a particular place with a particular purpose, does not mean she will be able to figure out how to re-organise her investment portfolio to take account of changing economic circumstances.

The kinds of expertise required to make such decisions are particular to those fields and cannot be transferred.

As a recent paper by the NSW Centre for Educational Statistics and Evaluation put it:

There are a large number of programs that claim to teach or assess students' critical thinking skills independently of content knowledge, for example, but the evidence suggests

that these programs only provide modest benefits in students' ability to apply critical thinking skills... Willingham notes, 'the evidence shows that such programs primarily improve students' thinking with the sort of problems they practised in the program – not with other types of problems' (2007, p.12).

Creative and critical thinking and problem-solving in mathematics looks quite different from creative and critical thinking and problem-solving in science, or history or the study of literature and the arts.

However, this is because those skills are being learnt in the process of learning different content knowledge. It does not mean that the creative and critical thinking and problem-solving skills of these various domains have nothing in common. There is something about the capability of creative and critical thinking that is cross-disciplinary.

What would that be? Part of the problem we face in discussions about general capabilities such as creative and critical thinking and problem-solving is that we lack clarity about what these skills actually are. What is a workable definition of critical thinking for this purpose?

According to the Australian Curriculum,

“students develop capability in critical and creative thinking as they learn to generate and evaluate knowledge, clarify concepts and ideas, seek possibilities, consider alternatives and solve problems. Critical and creative thinking involves students thinking broadly and deeply using skills, behaviours and dispositions such as reason, logic, resourcefulness, imagination and innovation in all learning areas at school and in their lives beyond school.”

Now this is a very broad definition, arguably a little too broad, and there may be a case for trying to more specific. The Australian Curriculum describes critical thinking as “intellectual activity that involves students learning to recognise or develop an argument, use evidence in support of that argument, draw reasoned conclusions, and use information to solve problems.”

I think it's possible to consider further refinement. Allow me to quote Richard Grallo, Professor of Applied Psychology at the Metropolitan College of New York, from an article he wrote in 2013 entitled “Thinking Carefully about Critical Thinking”:

*In situations where problems need solutions, yet the available thinking is inadequate, the need for critical thinking is heightened. In environments where sloppy thinkers, wishful thinkers, liars and knaves roam about unidentified, some sort of special thinking is required*

*to sort fact from fiction and to distinguish the valuable from the worthless. Critical thinking is a vaccine against “cognitively transmitted diseases” of epidemic vagueness, falsehood, runaway wishes, untestable propositions, and incoherent projects. Yet what exactly is critical thinking? How can it be implemented? Why should we bother with it?*

Grallo draws on the definition of critical thinking put forward by Peter Facione that clearly links it to the activity of **judgment**. That is, critical thinking is related to the ability to come to the point in one’s thinking where one can definitively answer “yes” or “no” to questions of fact, value, or action. Questions of fact take the form, “Is this true?” Questions of value take the form, “Is this a good thing?” or “Is this better than that?” Questions of action take the form, “Should I do this?”

So, how does one come to the point where one is able to answer such questions? Such questions arise in **all** domains of human knowledge and activity, and the relevance of this issue **transcends** disciplinary boundaries, so it is reasonable to ask: Is the underlying cognitional process that brings, for example, an engineer to the point where she can say, “Yes, I should use reinforced concrete and a suspension design for this bridge” the same cognitional process that leads the investment banker to say “No, shifting from property to cash would be a bad idea at the moment”?

Here I would like to introduce you to the thought of the Canadian Jesuit philosopher, Bernard Lonergan, who lived from 1904 to 1984. In 1970, Time Magazine reported that “Lonergan is considered by many intellectuals to be the finest philosophic thinker of the 20<sup>th</sup> century.” He is best known for his monumental 1957 work, Insight, which has the subtitle, “A Study of Human Understanding”. It is a work of epistemology, that is, the study of human knowing, especially with regard to its methods, validity, and scope, and the distinction between justified belief and opinion.

Lonergan’s theory about what is meant by knowledge and by knowing, about how it is we can say we know anything at all, can help us identify and address the false dichotomy between knowledge and the general capabilities of critical and creative thinking and problem solving. Using Lonergan’s framework of formal cognitive operations adds a philosophical perspective and structure to these concepts.

In Lonergan’s framework, knowledge is gained through a dynamic cognitional process that **necessarily** involves thinking creatively and critically.

For Lonergan, knowing involves three kinds of mental activity or thinking, working together: first, attentively experiencing data; then gaining insight or understanding, through intelligent inquiry, about possible meanings and interpretations of the experienced data; then finally reflecting on, and judging reasonably about, which of these possible meanings is most likely to be true and real.

Lonergan refers to this as the Generalised Empirical Method, that involves us following a set of what he calls “transcendental imperatives” if we want to come to know reality.

1. Be **attentive** to the data of experience.
2. Be **intelligent** in inquiring into that data and coming up with possible understandings.
3. Be **reasonable** when judging between the competing possibilities

We can use the Alfred Hitchcock movie, “Dial M for Murder” as a way of explaining Lonergan’s approach. The movie is about how a husband frames his wife – played by Grace Kelly – for murder. Beer’s account focusses on the mental activity of the detective, Chief Inspector Hubbard, as he first goes about attending to the data and gathering evidence at the murder scene and interviewing persons of interest.

Then he asks relevant questions of the data to formulate possible theories to explain the murder. This second level of consciousness actually involves creativity, or creative thinking, to imagine different ways in which the disparate bits of data could be assembled into a plausible theory, a coherent picture that makes the data intelligible. This is similar to the way we imagine how the data presented to us when we do a crossword puzzle could lead to a number of different possible answers to any given clue with a given number of letters.

Then finally, Hubbard reflects critically on whether he has enough evidence to answer all the relevant questions, to be able to definitively affirm his theory that it is the husband who is the guilty party, not his wife, who was originally convicted and is on death row. Up until the final question is answered, the husband’s guilt is just a theory. Once that question is answered, when he opens the door to his apartment using a key that only the guilty party would have, Hubbard is able to judge correctly that the husband is guilty. At that point, and not before, he knows the husband is guilty.

And then he also acts responsibly to ensure the wife is released from jail.

So, while I haven’t got time to go into it in detail today, there is a fourth transcendental imperative in Lonergan’s system, namely “To be **responsible** when **deciding** how to act upon what you have come to know.”

So, to summarise, in Lonergan’s epistemology, there are three distinct types of activity in acquiring definitive knowledge about anything, that is, in coming to reasonable judgement about matters of fact, so that you can say “Yes, this is the case. This is true.” Or “No, that is not true.”



The **first** is attending carefully to the data of experience – this is experiential thinking. The **second**, which depends on the first, is intelligently asking relevant questions in an effort to gain insight into possible explanations for the experiential data that has been attended to. This involves a form of creative thinking. The **third**, which depends on the previous two, is exercising reasonable judgement about the likely truth or otherwise of the competing explanations. This is critical thinking. Coming to know something involves activity in all three types of thinking: experiential, creative, and critical.

So, if the attainment of knowledge itself involves creative and critical thinking, do you need to attempt to teach the skills of creative and critical thinking explicitly and separately?

One way to explicitly teach creative and critical thinking is to encourage students to consider themselves, in their capacity as learners, as the objects of experience, inquiry, and judgement. That is, we can teach creative and critical thinking by helping students pay attention to, ask questions about, and critically assess what they are doing when they learn something, when they come to know something about a subject.

This application of Lonergan’s Generalised Empirical Method that expands the data of experience beyond the data of our senses to include the data of our consciousness. This is metacognition, which will help students in coming to know themselves as creative and critical thinkers and problem-solvers. The development of these skills are by-products of students growing in self-understanding as knowers.

It is important to note that Lonergan’s work suggests this can be done in every subject. This underlying dynamic cognitional process is common to all knowing, to all fields and disciplines of knowledge. And this is why I would suggest that Lonergan’s framework allows us to conclude that not only are these important skills learnt in the process of deepening and broadening one’s content knowledge in various disciplines, but it also allows students to *know* that they are acquiring these skills. This will happen if teachers call the attention of their students to the cognitional processes by which their knowledge is growing, no matter what the subject or discipline. In other words, we can say that these skills are cross-disciplinary **in that specific sense**.

Let me now cycle back to Grallo’s quote, and ask, now that I’ve outlined an account of how we can think about how knowledge and critical thinking skills are related, “Why bother with critical thinking at all?” Perhaps a story will help answer that.

Two years ago I spent a month in the USA, including three weeks at the Harvard Kennedy School of Government on a course for Senior Managers in Government. During my first week in the US, while

I was having discussions with education think tanks in New York and Washington, the country was transfixed by events that many commentators described as chaotic taking place in the White House. It was the week in which the President's new Press Secretary, Anthony Scaramucci, had piled vitriol on Reince Prebus, the President's then chief of staff; this was closely followed by Prebus' resignation, replaced by General John Kelly, who promptly fired Scaramucci.

The country was also still acclimatising to the new presidential style, particularly the use of Twitter as a tool of political warfare. Almost every day some new tweet was a source of incredulity, amazement and division. The supreme irony of the President's regular use of the term "fake news" was an indication of how American society was in danger of losing its ability, if not its willingness, to distinguish fact from fiction.

By this time I was at Harvard, and had picked up a book at the Co-op Bookstore by Tom Nichols, Professor of National Security Affairs at the US Naval College, entitled "The Death of Expertise: the campaign against established knowledge and why it matters". Nicholls sets out his thesis in the preface:

Something is going terribly wrong. The United States is now a country obsessed with the worship of its own ignorance. It's not just that people don't know a lot about science or politics or geography; ...the bigger problem is that we're *proud* of not knowing things...The foundational knowledge of the average American is now so low that it has crashed through the floor of "uninformed", passed "misinformed" on the way down, and is now plummeting to "aggressively wrong".

I read this the day the Charlottesville riot happened, leading to the death of a young woman run over by a car driven deliberately into her by someone she didn't know but who opposed her political views. Commenting on the President's initial response during one of our classes, CNN's veteran commentator and Harvard Kennedy School faculty member David Gergen – who served in the White House under both George Bush Snr and Bill Clinton - said that the country was "pulling apart", and he reflected soberly on the role of the professional media as well as social media in process of cultural and political decay.

It reminded me of what Waleed Aly had said in an interview that year about why he is not on social media:

"I don't think it is any coincidence that the rise of these forms of media have coincided with the rise of an increasingly shrieky, trench-warfare-like public discourse."

As a result of advances in technology, we now have access to more information than ever before. But has this led to more wisdom? Nichols argues that this expanded access to information has not ushered in a new Age of Enlightenment.

Rather it has helped fuel a surge in narcissistic and misguided anti-intellectual egalitarianism that has crippled the possibility of informal and informed reasoned debate on all manner of public issues.

For many educators, particularly those advocating a stronger focus on transferrable skills, it's the individual's ability to adapt to this new technological revolution so as to be able to work in the as yet unknown jobs of the future, that is the priority. While gainful employment is important, it is not the only object of education. The state of our polity is an equally important, arguably an even more important, reason to bother with critical thinking.

And it is also why we need to bother with a knowledge-rich curriculum. While post-modernism has led to many important insights about power and ideology, a damaging aspect of its legacy has been the undermining of the importance of factual and cultural reference points. The undermining of the solid ground of reality upon which individuals can base their own solid sense of self and of their own agency in a world that is knowable represents the greater threat to society. Which is why we need to focus on content knowledge.

This is the backdrop to the current review of the Melbourne Declaration on the Educational Goals for Young Australians.

The Melbourne Declaration was issued in 2008. It is now more than a decade old, and in need of revision. Why? Not so much because the overarching goals have changed, but because the social, economic, cultural and global context within which the education system is now operating has transformed in ways could not be foreseen in 2008 and the significance of which that have perhaps not been fully appreciated by education policy makers and practitioners.

How has this context changed? For a start, consider the major event of 2008 that signalled change on a global scale. On 15 September 2008, the fourth largest investment bank in the world, Lehman Brothers filed for bankruptcy, triggering the global financial crisis.

The Melbourne Declaration was signed two months later by all Education Ministers, but there is nothing in the Melbourne Declaration that alludes to the seismic shift in Australia's social and economic situation that had just got underway.

But arguably even more significant than these events of 2008, were the events of 2007. In 2007

- The first iPhone is sold
- Facebook (in late 2006) opened its platform to anyone with an email address
- VMware software company goes public – it's the software which enables any operating system to work on any computer and is the foundation of cloud computing
- Hadoop Software is launched, providing a free, public, open-source framework that enabled multiple computers to work as one – the foundation of big data
- Google launched YouTube and its own operating system Android
- IBM launched Watson, its cognitive computer
- Netflix streamed its first video
- The mysterious Satoshi Nakamoto launched the Bitcoin phenomenon
- Twitter split off on its own independent platform and went global

Each of these events on their own were significant, but collectively they arguably represent the biggest technology inflexion point in history since the invention of the printing press.

These two events – the Global Financial Crisis and the Great Digital Revolution – continue to shape the context of Australia's education system. Just when technology was starting to open up potential for a quantum leap in productivity, the economic capacity to support the expansion and enhancement of our educational, regulatory and other systems needed to harness the potential of that technology for the majority of citizens was severely compromised.

So the result has been increased social disruption and loss of faith in our political system. The Occupy Movement, Trumpism and Brexit are manifestations of this phenomenon. And we are not immune from these problems in Australia.

So it is timely for us to recommit to the goals of education in all its economic, social, cultural and personal dimensions. Here Lonergan's framework can again be a useful.

According to Lonergan, education engages students within a given tradition of culture, language, thought, structure, but also opens the way to new formulations that will keep the tradition alive, as something that continues to grow is alive.

An education system that functions out of this ideal will honour students' questions because questions and inquiry arise when human intelligence and wonder - the eros of the human spirit - attends to the movement of life as experienced. When teachers and others responsible for education understand that creativity is a by-product of the process of coming to know, we can guide students to tune in to the movement of life as experienced, to ask their own questions, to articulate in some form their insights, and to critically assess the truth of those insights.

**“In doing so, we provide students with hope and the opportunity to contribute creatively to the world in need of transformation.** Our conversations about knowledge and the world under construction will flourish from the creative and critical thinking of a new generation of knowers who have learned that they have minds, and that they know how to use them for the good.” (Moira T. Carley, 2001)

In the words of Seamus Heaney in “The Settle Bed”, which is a metaphor for economic, social, cultural and familial inheritance that both blesses and burdens each new generation, they will have come to know that “whatever is given can be re-imagined, however four-square, plant-thick, hull-stupid and out of its time it happens to be.”

David de Carvalho, CEO, Australian Curriculum, Assessment and Reporting Authority  
ResearchED Conference, Brighton Grammar School, 24 August 2019

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