where thinking and learning meet

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introduction: the chicken or the egg?

What comes first, the chicken or the egg? Nowhere is this question more meaningful to me than within the context of learning and thinking. As discussed in the Preface, thinking and learning are inextricably linked. To try to address one, independent of the other, is to do an injustice to both.

Many teachers feel that their students' thinking is evidenced through their use of a Mind Map or 6 Thinking Hats tool. While these tools direct their thinking and perhaps enable them to think more effectively, their thinking will remain limited until the thinking tools are embedded into the thinking process, which in turn is embedded into the learning process.

Conversely, many teachers provide learners with an 'inquiry' process to 'teach them how to learn'. Upon closer examination, the approach provided is often little more than a research process. While it may lead to increased independence with respect to some skill sets, it generally falls short of promoting the development of deep knowledge, deep understanding, deep learning and far transfer. Until learners engage in an inquiry framework that truly mirrors the real life learning process and embeds the thinking process, learning will remain superficial and inauthentic.

It is the inter-relationship between the thinking process and learning process that will enable the learner to meet their true thinking and learning potential.

This book is organised into 4 sections:

Section 1: First steps to change

Because the approach outlined here represents a significant deviation from the ways in which thinking and learning are currently addressed in schools, I have chosen to begin our journey with a focus on change. Why is change so difficult? How can change be initiated? How can change be sustained?

Section 2: Real thinking

A deep understanding of thinking is necessary in order to fully understand the deconstruction of the learning process. As a result, I will examine the thinking process, thinking tools and introduce a thinking framework that will teach our learners how to think.

Section 3: Real learning

A focus on learning how to learn will follow. I will deconstruct the learning process and introduce the Clark *think!nQ real learning framework* as a model that mirrors the natural learning process.

Section 4: Where thinking and learning meet

Finally we will consider the complex inter-relationships that exist between the thinking process and learning process. In examining where thinking and learning meet, I will introduce a planning framework that will enable and empower users to design and deliver a comprehensive and authentic curriculum.

chapter one:
thinking about thinking

The term 'thinking tools' is often heard in classrooms today but how clearly is it understood? What are thinking tools and what purpose do they serve? How can they be incorporated into our practice? How should they be incorporated into our practice? How are they being incorporated into our practice?

Thinking, we do it all the time ... we can't help but do it. It happens during maths class and it happens during recess. We certainly don't wait until 'thinking time' on Tuesday afternoon, and we don't wait until we are offered a tool to assist us. If thinking is so natural, then why do we struggle to describe it, understand it, intelligently discuss it and address it explicitly with our learners? Why is it such an ethereal phenomenon?

The difficulty may rest with the 'big push' but 'little support' we have been offered in the area of thinking. Apart from Bloom's Taxonomy very few frameworks have been provided to explain how thinking is developed. Very little has been suggested to challenge this widely accepted theory of thinking.

Consider Bloom's Taxonomy (Benjamin Bloom, 1956; revised Anderson and Krathwohl, 2001).

The Taxonomy of Educational Objectives was proposed in 1956 by Benjamin Bloom, an educational psychologist at the University of Chicago. Like other taxonomies, Bloom's is hierarchical in its design. Learning at the higher levels is dependent on the mastery of learning at the lower levels. The taxonomy therefore suggests levels of thinking in a particular hierarchical order; with each level of thinking dependent on the prior level. What do you think? Do you agree that knowledge represents the first level of thinking? Do you believe that evaluation is a higher order ability than idea generation or the development of a solution? *The Taxonomy of Educational Objectives* (Bloom, Mesia, Krathwohl, 1964) identifies skills representative of each level of thinking. For example, the skills of prediction, estimation, interpretation and explanation are outlined under 'comprehension' level thinking. The ability to compare and contrast is represented in the 'evaluation' level of thinking; and summarisation is noted as a skill indicative of 'synthesis' level thinking. What do you think? How many of us referencing Bloom's framework have taken the time to analyse and evaluate its contents, or its message about thinking?

In my opinion, discrepancy, inconsistency and confusion are pervasive in both the original framework and the revised edition. Still, Bloom's Taxonomy is readily referenced in education circles, curriculum documents and in education resources world-wide. Is it any wonder that educators are confused? What is your opinion of Bloom's Taxonomy ... what do you think?

I find myself frustrated with the confusion, anxious with the time it seems to be taking to really move thinking into our classrooms, and excited at the possibilities that exist for making a difference in the lives of our kids. Let's do it ... let's figure out this thinking thing; let's take away the mystique and let's change our practice ... because we can!

If we are ever to develop our knowledge and understanding of thinking, we have to take the time, put in the effort and engage in conversations about thinking ... we have got to think about thinking.

In addition to the questions asked earlier within the fabric of this text, the following questions may also be considered:

Thinking About Thinking...

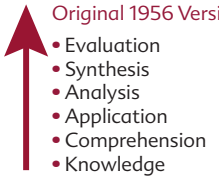
- What does it mean to think?
- What are thinking skills?
- What are thinking tools?
- What is the relationship between thinking skills and thinking tools?
- What are levels of thinking? Do you believe that thinking occurs in levels?
- Is there higher and lower level/order thinking?
- What is the relationship between higher and lower thinking?
- Can you think at lower levels without higher levels? Can you think at higher levels without lower levels?
- What is the relationship between thinking and learning?
- Is it necessary to understand the relationship between thinking and learning in order to infuse thinking authentically into your classroom practice?

Bloom's Taxonomy and Real Thinking

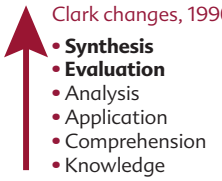
Before introducing you to the specifics of my work, it might prove beneficial to first share my thoughts in the area of thinking.

As will be the case with many of you reading this right now, as a student in teacher's college I was offered Bloom's Taxonomy as 'the' definitive guide to developing an understanding of thinking. Further to this, I was advised to use this model to 'incorporate higher order thinking' into my lesson plans. And so I set out to decipher this model so that I could begin to design my 'thinking curriculum'.

Unfortunately or perhaps, in retrospect, fortunately, I struggled. The more I considered the model and what it represented, the more I found myself challenging it.



"First there is knowledge and then comprehension, application follows, then analysis, synthesis and finally evaluation ... hmmm ... synthesis and then evaluation? Evaluation is the thinking associated with judging and deciding and synthesis thinking requires one to take the parts and put them together in a new and different whole. Synthesis thinking is generative and creative. Certainly the development of ideas requires a greater complexity of thinking than does the ability to make judgments. As an example, if I judge a story and outline the strengths and the weaknesses and then walk away, what have I accomplished? Surely the desired outcome would involve my ability to counter the weaknesses; identify recommendations for improvement or change. Evaluation must therefore be lower in the taxonomy than synthesis ..."



"... What about the rest of the sequence. Certainly you don't begin your thinking with knowing something and then understanding it? If I know I know it, I must have some degree of understanding or I wouldn't actually know it ... I may only know about it superficially, but surely I can't be considered to 'know' anything without some degree of understanding?

It was actually at this point that I began to challenge the accepted belief that thinking occurred in 'levels'. Instead, I decided that there were **types** of thinking, with **levels existing**

within each type. I knew that I could know and understand superficially or with great depth and breadth; I knew I could analyse at a lower or higher level; or evaluate at a higher or lower level. As a result, I implemented a further change to the Bloom's model.

Clark changes, 1990

- **Synthesis**
- **Evaluation**
- Analysis
- Application
- **Knowledge.Comprehension**

I was comfortable with my changes to the model thus far, but I was feeling uneasy about the ordinal placement of knowledge.comprehension in the thinking hierachy. Did it really belong first in the sequence?

"... You don't know what you don't know so you can't know what you have never heard of!" Before you know and understand anything, you need to **find out**. Certainly thinking begins with the finding out experience. The more solid this experience, the greater the opportunity for eventually knowing and understanding ..."

Perhaps the 'finding out' experience was intended to be implicit within Bloom's model. Recognising this possibilty, I felt it needed to be *explicit*. I wanted my learners to know how *critical* the 'finding out' experience was to thinking. If the 'finding out' experience is limited, thinking will be limited; if the 'finding out' experience is biased, thinking will be biased. I wanted my learners to know that the only way they take information into the brain is through their sensory organs - they see it, smell it, hear it, taste it, touch it. I wanted them to recognise the importance of a diverse, limitless, interactive and multisensory, 'finding out' experience in growing understanding and, ultimately, deep knowledge. Because of this critical aspect of thinking, I developed criteria to guide my students in their 'finding out'. They would need to access a minimum of four resources for finding out, and consider a minimum of two perspectives, in an effort to safeguard against a limited and/or biased experience; they would need to use most interactive/multisensory tools prior to more passive unisensory resources; and they would need to select their order of tool use to ensure they moved from strength to struggle. Once again, I made changes to the Bloom's model ...

Clark changes, 1990

- **Synthesis**
- **Evaluation**
- Analysis
- Application
- **Knowledge.Comprehension**
- **Information**

"OK ... so you engage in finding out (information thinking) and immediately you understand it and know it ... this seems to be a HUGE jump! How does one move from finding out new information to understanding it and truly knowing that information?"

I found it difficult to accept that this transition was implied, as if it actually occurred innately. The more I reflected on this challenge the more excited I became at the prospect of what this change in the model might mean for my teaching and learning.

Let's do it ... let's figure out this thinking thing; let's take away the mystique and let's change our practice ... because we can!

"It's **PROCESSING**! I take in new learning and begin to process it ... processing occurs immediately ... it occurs regardless of whether I am cognisant of it ... as I find out, I process innately. If I could 'unpack' what occurred when I processed, I could deliberately and strategically direct my learners in their processing and consequently impact their thinking and learning outcomes. So what occurs when I process? I examine what I am taking in; considering the parts of what I am being exposed to (that's analysis); I judge what I am taking in; do I agree or disagree with this new information? (that's evaluation); and I question or challenge the new information or my current understanding or foundation of knowledge (that's synthesis). This processing leads to a NEW understanding.