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Why Is Everyone Talking about the 'Thinking Curriculum'?

'What do you mean by the "thinking curriculum"? Is this yet another add-on to the already-crowded curriculum? How can thinking be assessed in any case?' These are questions frequently asked by teachers.

The idea that both teachers and students should think about the teaching and learning process raises exciting prospects. Instead of the traditional 'teacher as expert' model, where a body of information and skills is doled out to students in small, easily digested portions, the thinking curriculum challenges the teacher to create learning environments that promote intellectual rigour and encourage innovative thinking. Exposed to such environments, students learn to actively build links between concepts and construct their own knowledge and solutions. Such classrooms work cooperatively to build an extensive range of strategies that allow students to streamline their thinking and maximise their success.

Some 30 years ago, the school curriculum mirrored the requirements of the dominant model of employment – the specialised, repetitive expertise evident in the manufacturing industry. The workforce sought employees who could be trained to follow a procedure with minute precision and who were content to duplicate that procedure over and over again throughout the day, week after week, year after year, for what turned out (for most employees) to be a lifelong career with the same company. Thinking was neither encouraged nor rewarded in either the students or the workforce.

Increasing automation and the lure of cheaper offshore production have resulted in some major upheavals in the Australian employment profile in recent years. The recreation and sales industries have both increased to become the majority employers. Full-time trade apprenticeships are now outnumbered by part-time semiskilled occupations. At the same time, the technological revolution has impacted greatly on the skills expected of today's workforce. In today's economy, the abilities and knowledge of a company's workforce are considered by many employers to be more valuable than the physical assets of the company. The meteoric rise in the use of information technology has at the same time brought opportunities for innovative individuals to create their own employment and wealth to a degree never before experienced.

Today's workforce needs to think creatively. They must be able to adapt the skills and knowledge they use to handle familiar situations to solve problems associated with unfamiliar situations. They need to anticipate potential problems and determine the most appropriate strategies for handling them should they arise. By encouraging today's students to think creatively, teachers can help prepare students for the task of building the knowledge and skills needed for the future.

Information technology has effectively reduced the size of the world. Our workforce needs to be able to consider ideas from the range of different viewpoints that reflects the diversity of cultures and perspectives operating in the global economy. Today's employers

need 'team players' who see the value of sharing ideas and strategies – employees who expect success from the outset and persist until a solution is found.

Here then is the underlying reason behind the need for a paradigm shift in education. Our system needs to move away from the creation of independent, process memorisers to the making of strategic, innovative thinkers who work well in teams and view individual diversity as a means of enhancing the overall skills and knowledge of the group.

The thinking curriculum is one way of achieving such a change. Teachers who deliberately set out to foster divergent thinking, creative problem-solving and the sharing of strategies across the classroom encourage the development of the efficient higher-order thinkers needed for tomorrow's world.

This book explains how thinking can become a part of the mathematics curriculum in our schools. It is ideally suitable for use with students in the middle years of schooling; however, many of the activities and methods for embedding thinking within the classroom could be adapted to other levels and other curriculum areas.

Thinking Allowed commences with an overview of how to plan for the introduction of thinking in the classroom. This is followed by descriptions of a range of thinking theories and some of the different tools developed by acclaimed experts in the field of thinking curriculum. A historical background is provided about each theory, followed by examples of how the tools could be used in the middle years mathematics classroom.

Also provided are:

- a range of graphic organisers that can be used to assist students to clarify their thinking and make it explicit.
- a detailed breakdown of ways in which the dynamics of the classroom can be organised to support thinking and help students build connections
- a range of suggestions for assessing thinking
- examples of extended tasks to use with students as they become familiar with the expectation of 'thinking' in the mathematics classroom.

Throughout the book there are many examples of mathematics activities that can be used with students. Specific activities have also been included to support professional learning teams in improving their own understanding of the thinking curriculum. In so doing it is hoped that the teaching and learning process will become a richer, more exciting experience for both students and teachers alike.

The Thinking Curriculum in the Mathematics Classroom

A lecturer once said to me that teaching mathematical processes without real-life, meaningful application was akin to training a football team without ever letting them play a game. It seems a ludicrous proposition when applied to the football team and yet, in many mathematics classrooms, students spend a lot of time rehearsing processes and very little time applying the mathematics to meaningful situations.

Research by Lubienski (2000) suggests that for many students from lower socioeconomic levels, mathematics lessons are, in fact, something that the teacher 'does to them'. Faced with problems in their everyday life where mathematics could actually assist, these students make little or no attempt to use the classroom mathematics they have experienced. They do not regard classroom mathematics as a tool to help them in life. Indeed Lubienski found that students from low-socioeconomic situations (low-SES) have a preference for closed, short-answer questions rather than problem-solving, contextualised problems.

The reasons behind this seem to be manyfold. For example, one suggestion is that contextualised questions are often reflective of the society's dominant middle-class background and therefore may seem alien to the low-SES students' experiences. Another explanation may be that, for some students, mathematics is more about finding the answer that will satisfy the teacher than about learning a useful skill for dealing with life. In either case it would seem much easier to learn the means of decoding word problems related to alien contexts and then apply memorised formulas than to probe for deeper understanding of the mathematics.

Decoding is an ingenious practice worthy of some words itself. Teachers trying to contextualise problems often fall prey to including key phrases such as 'how many', 'shared between', 'groups of', 'altogether' – all of which direct the decoder to apply the process most commonly linked to each phrase. The students obtain the correct answer without ever having to think very deeply about the problem.

A classroom focused on thinking cannot be created overnight. Students need to be willing to share their ideas and build on each other's ideas. Teachers can help this process in a variety of ways. Some methods for encouraging this behaviour in the classroom are listed in the following pages.