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Introduction

Four major themes run through this book. They are thinking chips, the 4 Ps of good thinking and teaching, our changing multiple intelligences and teacher and student questions that lead to better thinking. Together they can help any teacher or school staff move towards the goal of *teaching for understanding* rather than the traditional and outdated goal of *teaching for remembering.*

We think about, or mentally process, content in many different ways. For example, we use different mental processes, or mental programs, for problem solving, summarising, generalising, creative thinking, critical thinking, etc. If you think carefully about the nature of these mental programs you will discover that they each consist of a series of short questions that we unconsciously ask ourselves, at incredible speed, when we think. I call this series of self-questions THINKING CHIPS. Their nature and development is the major theme of this book.

The quantity and quality of the questions on our thinking chips for spelling, problem solving, playing sport or creative thinking, varies widely from person to person. The questions on the thinking chips of people who are good at these mental and physical tasks can be identified and shared with all students. This can be done through the simple process of metacognition: careful reflection on the specific thoughts that pass through one's mind during a mental or physical process. Examples of thinking chips, and the way they can be developed in the classroom, are presented throughout the book.

Another theme running through ***Thinking Chips for Thinking Students*** is what I call the 4 Ps of good thinking. Cognitive psychologists have looked for common threads in the thinking of people who are good at different subjects, jobs, sports and hobbies and have found that good thinkers show a POSITIVE attitude towards a mental or physical task. They are also quick to sense relevant PATTERNS in the incoming information and are good at PROBING information they attend to by asking their own really good questions of it. Finally, they are also good at mentally PICTURING, or summarising, the key words and ideas in information.

POSITIVITY, PATTERN SEEKING, PROBING and PICTURING run through all good teaching and learning—they are the cornerstones of the thinking classroom. A positive attitude or disposition is vital in helping students undertake various tasks and we can identify and teach students the necessary disposition they need for particular kinds of thinking. Some of these dispositions are suggested in Chapter 2.

Chapter 3 is about pattern recognition. Poor thinkers with a good disposition generally have a learning problem because they fail to see relevant patterns in information. Some thinking chips that help pattern recognition in different circumstances are offered throughout the chapter.

Chapter 4 takes a more detailed look at the vital topic of self-questioning, which of course is related to thinking chips. A question matrix and a question map are offered as examples of aids, or scaffolds, for helping students to improve both the quality and the quantity of the questions they can create for any topic they are investigating.

The key terms or concepts in a reading are often related to each other in a geometric shape which becomes the shape of a graphic organiser for summarising the terms and the way they are connected to each other. In Chapter 5 a variety of organising shapes are given as well as self-questions that pass through the mind of good visual summarisers.

A third theme, multiple intelligences, is woven throughout the chapters. Links are made between the 4 Ps and people who are strong in particular intelligences.

Students can be taught strategies for developing creative thinking and in Chapter 6 a variety of thinking chips used by creative thinkers are offered to help students break away from traditional patterns of thinking that block their ability to flex.

Critical thinking is discussed in Chapter 7. As with creative thinking, having the right disposition is vital for strong critical thinking. Questioning, particularly probing questioning, is important in judging information. The greater the number of relevant questions critical thinkers have on their thinking chips the more objective and fair minded their judgments.

Chapters 8, 9 and 10 look at issues that are strongly related to the *thinking curriculum* or to *teaching for understanding.* Better thinking basically demands better questioning, both on the part of the teacher and the student. These chapters consider new frameworks for question design, authentic and portfolio assessment, and the core thinking processes. Chapter 11 discusses the implications of our different styles of thinking and in Chapter 12 some important points are made about our ever-changing brains and intelligences.

Using "Thinking Chips"

This book is written in a style that hopefully encourages you, the teacher, to examine different aspects of your own thinking and intelligences and look for activities and materials that develop your students' thinking skills.

These pages will provide you with a framework for understanding the part that many of the activities play in challenging different aspects of your students' thinking. Too many so-called "thinking activities" used in classrooms are selected to simply provide fun; rather, we need to select activities on the basis of the thought processes they engage and to then consider how they do this.

Occasionally ask your better thinkers to think about, and talk about, the kinds of patterns, questions and mental pictures they use in coming up with answers and other products of thinking. Metacognition is indeed a simple but powerful tool for developing better thinking students.

CHAPTER

1

Thinking Chips

Pre-reading Questions to Ponder

- Can we improve our intelligences?
- Do our brains need mental programs to process information?
- What are "thinking chips"?
- What are good thinkers in any subject good at doing mentally when taking in new information from their area of interest?

Thinking Chips

The memories of your students store not only content, methods and pictures, but also mental processes for connecting and using information in different ways. Each student has stored general mental processes, or programs, for comparing, ordering, summarising, distinguishing facts from opinions or causes from effects, for general problem solving, decision making, and so on. These mental processes must develop naturally because they are rarely taught in school.

Each thinking chip consists of a series of unconscious questions that we ask ourselves when we think in a particular way. For example, the quantity and quality of the questions that we each have on our thinking chip for spelling or for problem solving varies widely from person to person. Therefore, we can teach students to ask better questions—to put on their individual thinking chips for spelling, problem solving and other kinds of thinking. In this way we can improve the mental programs that make up their tactical intelligence. Yes, we can teach students how to improve their intelligence!

To get a feel for what a thinking chip looks like let's focus on the mental task of having to remember the spelling of a difficult word.