# 13

# Becoming a Thinking School

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## KEY CONCEPTS

- The 10-year development of a whole-school, integrated thinking-skills approach in New Zealand
- Using multiple maps for scientific problem solving
- How Thinking Maps® changed collaboration, communication, and performance across a K–12 single-sex girls' school

I have always thought that all schools could become "thinking schools"—schools that consciously and systematically focus on the development of cognitive and critical thinking for all students—via various pathways. St. Cuthbert's College in Auckland, New Zealand, the girls' school described in this chapter, piloted and evaluated a range of thinking strategies and approaches as a first stage, before finally realizing that doing a thorough job of introducing, training, and implementing Thinking Maps would actually provide a basis of understandings about cognitive strategies in general. When I was the associate principal and later researcher and consultant for the school, I became aware that this foundation allowed other strategies to be used and in fact strengthened various combined approaches. Over time this allowed for autonomy for both teachers and students as they selected the best strategies to fit particular purposes. Students using Thinking Maps on their own is a start but is not the end point or long-term goal of becoming a thinking school. This has been witnessed over the past three years as Thinking Maps have been integrated into dozens of schools in England (in coordination with the Cognitive Education Centre at the University of Exeter) that are refining their own evolving definitions toward schools in the 21st century focused on the wide-ranging processes of thinking.

St. Cuthbert's has developed many learning approaches, but a solid understanding of the basic thought processes gained through Thinking Maps has been crucial. The other approaches that have been complementary are Costa and Kallick's (2000) Habits of Mind in the behavioral domain and a focus on Bloom's (1956) Taxonomy of Educational Objectives to explain to students the steps that can be taken to think in more complex ways. In addition, this school has a focus on philosophy. Originally this was developed through the Philosophy for Children

program developed by Dr. Mathew Lippman, but now questioning, building arguments, logical and lateral thinking, making assumptions, generating concepts, and ethical thinking are all given significant curriculum time. Time is also deliberately given to the teaching of various skills using mobile phones and Internet blogs, which allows students to use Thinking Maps and other strategies outside the classroom. This has resulted in a huge expansion of the information-technology department, which services student responses and links both teachers and students together in a sophisticated, flexible thinking community, responsive to and respectful of others' ideas.

The pathway this school has taken has resulted in learning and *thinking* being central to the way everything is done. The school community sees itself as a thinking school because all the opportunities provided by the school are in some way designed to extend students' thinking outcomes.

## BEGINNING THE LONG PROCESS

In the later part of the 20th century, our school began an evolutionary process that finally envisioned a community of learners who could move beyond "tacit use" of thinking skills. Through research, practice, personal discoveries, and many rich conversations, we made a multiyear commitment to integrating the Thinking Maps language into our community. Over the recent years, we believe that our school has achieved "reflective use" of these tools—a sophisticated metacognitive use involving reflection and evaluation (Swartz & Perkins, 1989). We have come to believe that if our students functioned as reflective users of Thinking Maps, this would increase their thinking-skills repertoire and encourage autonomy of thinking and collaboration, certainly important if not essential outcomes for every school in a democratic society.

An assumption underlying the explicit teaching of thinking is that instruction in thinking skills can enhance the development of a student's thinking-skills repertoire (e.g., you can identify and teach the skills required for conscious decision making). In a narrow sense, it is always possible to teach thinking-skill strategies and tools and to test a student's cognitive comprehension of these skills or even his or her ability to apply these skills to a given problem. In a broader sense, the vision of many educators and researchers of the thinking-skills movement of the past few decades has been that the direct teaching of thinking is possible and is a necessary next step in the evolution of teaching and learning toward transfer of thinking skills across—and deeply into—content areas, for interdisciplinary problem solving and lifelong learning. Our story is of a school wanting it both ways: direct, formal teaching of thinking skills and explicit transfer into content areas.

St. Cuthbert's College is a unique, single-sex, independent school spanning the K–12 grade levels, with a student population of 1,500 girls aged 5–18. The college is expected to provide an outstanding education that not only encompasses academic, sporting, and cultural excellence but also adds the dimensions of character and values education. Thus, the long-term development of a systematic, fully integrated use of thinking skills, ultimately leading to our use of Thinking Maps, took a continuous focus and persistent attention to the goal.

There is a high expectation of all involved that we must provide for individual needs and produce graduates who can gain entry to the universities and courses of their choice and approach tertiary studies, and life, with the attitudes and skills that encourage success and personal fulfillment. Parents expect of the school that it retain its traditions and at the same time be innovative. Through the process of our evolution, we have moved from being a high-quality school with strong academic outcomes to being a true learning organization unified by a focus on developing high-quality thinking. Along the way, our academic results have moved us to the top rungs of the educational ladder in New Zealand, but this seems a sidebar to our evolving capacities to seek deeper understandings of how our minds work and to treasure the intrinsic rewards gained from becoming a school as a home for the mind.

## PHASE 1: DISCOVERING TOO MANY POSSIBILITIES

In 1992, staff and management began this process by reviewing the school philosophy guided by the following questions: What kind of learners do we want to produce in this college? What behaviors, attitudes, skills, and knowledge would they have? We agreed that we wanted our students to become adults who were lifelong, independent learners, who approached life's situations and problems positively and persevered to find resolutions and answers. It had been the norm in schools such as ours for teachers to be responsible for writing superb lessons. They were expected to supply students with books of resource notes and to test, train, and, in general, provide opportunities for students to learn. The focus was on disseminating information and expecting students to study and memorize all this valuable knowledge so they could have success in national examinations.

While our school did well in the national rankings of senior secondary examination results, there was a nagging feeling among some staff that our teaching methods were producing graduates who were dependent learners: students who had excellent recall skills, who were prepared to read and study hard, but whose work was careful, methodical, and pedestrian rather than original, inventive, and risk taking. This idea was supported by the fact that many good students gained fine marks of around 75%–85%, but relatively few broke into the 90th percentile at the university scholarship level. We decided that we had a responsibility to make a change for our students. We embarked on a project in 1992, which we hoped would lead our students toward being autonomous learners.

First, we made a list of all the qualities such a learner would have. What developed from this was the conviction that effective learners are good thinkers who have a range of internalized strategies they can use to do their work. Then we debated these questions, to achieve the changes required to create the learning community we had described:

- How would this change our teaching practice?
- How would this change how students apply themselves to education?
- What skills or strategies would they need, if "better thinking" were our goal?
- From the range of theorists and practitioners who wrote on thinking, learning, and best educational practice, which should we use as our models, and which of the many strategies should we choose?

By 1992, a range of exciting strategies, methodologies, frameworks, and programs was becoming available for teachers who were interested in encouraging their students to think deeply and independently. A group of our staff read through the available literature and attended courses on best practices. The problem soon emerged: too many possibilities. Everyone who went to a course or read one of these books came to school converted and full of enthusiasm to try out the new ideas. We were all over the place. Across our K–12 school could be found pockets of teachers "doing" such processes as Edward de Bono's CORT program, mind mapping, multiple intelligences, and learning styles.

This was all terribly exciting to those of us involved. We held many personal development–training sessions for the whole staff between 1993 and 1994, and some of us became specialists in one process or another. However, by 1994 it became obvious that we had made a great change to individual teaching practice, but done nothing that made a school-wide impact for students. An individual student could have had some very good lessons from innovative teachers but not have recognized the strategies used or their application elsewhere. In addition, students' thinking patterns or habits would have remained unchanged, and students would not have developed a set of strategies they could regularly use to do their work more meaningfully. We were also quite aware that there was very little conceptual transfer or internalization of the strategies.

## PHASE 2: FOCUS ON TRANSFER AND "DOUBLE PROCESSING"

As a staff, we decided to focus on transfer: We would all focus on a selection of strategies, teach them across all disciplines at the same time, practice them, and explicitly identify them, so students could see the transfer links and how useful they could be in different situations. We selected some of the lessons from several programs and had developed the firm belief that students who processed work in a number of different ways gained a deeper understanding of the content. We called this "double processing": If a lesson involved written notes in linear form, then homework could be to talk to parents about it. If a graphic organizer was used in class, then linear notes could be used for follow-up. At this stage, the graphic organizers we used were such things as the fishbone, the Venn diagram, sequence boxes, and mind mapping (or concept mapping). None of us had really associated these wide-ranging, disconnected graphics with a cognitive function as they were used by staff to sort content information given in class or for homework. They were prescriptive: Students were told to fill them in.

In 1998, we again reviewed our thinking program. So much had been done, but somehow it still seemed more like a personal development program for staff to improve teaching strategies than for the explicit development of autonomous learning for students. Had we gone wrong? Better teaching had led to better marks for all, but it seemed to us that we were not making enough of a difference for *all* students. We referred again to Costa's (1991) vision of a school as a home for the mind as a reference point. Here was a vision of everybody in a school community working together to make thinking central to the way everything was done. What we needed was a common, school-wide language that we could all use, which could be built on from age 5 to age 18 in greater depth. We had a unique opportunity to introduce good thinking skills early and develop them over the years so they really made a difference, but which approaches were out there that could do this?

## PHASE 3: UNITING THE SCHOOL WITH A COMMON LANGUAGE

In 1999, we decided to have a research year where interested staff would examine the various approaches, programs, and strategies that could form the basis of an effective thinking program. We focused on the primary elements of thinking from the critical, creative, and caring/affective domains. Thinking Maps appeared to be an excellent way to focus on eight basic cognitive processes and the use of the Frame of Reference for metacognitive development. The challenge for us was to get both staff and students to see these as effective thinking processes, united together as a language, rather than as isolated graphic organizers. Our goal was to gradually teach and implement these over three to five years so students would have a range of strategies to employ.

## YEAR 1: INTRODUCING THINKING MAPS IN 1999

To introduce a common visual thinking language to the whole K–12 continuum of St. Cuthbert's teaching and learning needs was an ambitious undertaking. We chose to introduce Thinking Maps through a three-year implementation cycle, by first teaching the use of Thinking Maps explicitly within noncurricular contexts. We chose this method of introduction since research (Perkins & Salomon, 1989) revealed that cognitive skills are not automatically acquired unless they are taught explicitly. This was a formal approach carried out by everybody: expected, planned, and agreed on by staff. Following the initial training, teachers were grouped into departments to find applications within subjects and units and were supported by follow-up

sessions as they gained confidence. They began with a narrow view of what an isolated map could do—and what the maps could do together—and we encouraged them to focus on students gaining confidence and experience in use across the curriculum.

We also established a Department of Thinking and employed a thinking coordinator to manage the program and write the lessons using a six-step methodology: Label the strategy (the cognitive skills and map), explain the purpose, practice (provide practice experience and feedback), transfer (put into different content contexts), evaluate, and reflect. Teacher attitude was crucial, and where the teacher was confident and prepared, the lessons proved very successful in teaching the strategy.

While the primary school staff and students had a positive attitude toward the Thinking Maps approach, some secondary staff expressed reservations. Secondary staff had concerns about teaching skills in noncurricular contexts; they disliked the imposition of creating "artificial or forced" opportunities for conceptual transfer. In turn, some secondary students questioned the need to learn about the maps separately because "the teacher shows us how to do them in class anyway." These older students said, "We already know how to think, and we don't need you to tell us." Generally, this is a situation easily overcome by confident, persuasive teachers who believe that the processes they are teaching can make a difference, but it is very difficult when the teachers themselves are unsure as they integrate the tools into their repertoire.

Despite these difficulties, we achieved our goal of having every child in the school introduced to the maps in an explicit way. Students are able to use all the maps as required in a range of situations and when use of the maps is genuinely integrated and flexible. Most staff members model metacognitive processes by saying, "I need to analyze this information—which maps do you think would be useful here?" Consequently, we see much greater choice and flexibility of use, including the use of a range of maps to reach a decision or to extend an idea.

We believe that our earlier work of encouraging teachers to get students to doubly process notes also paid off: During some lessons, students were to take notes only in map form and then for homework write up the information in linear form, and vice versa. We saw excellent collaborative work develop, as some groups elected to take class notes in map form and work as teams to develop the ideas as fully as possible. It is much easier to see ideas being extended when they can be presented visually, and students enjoy adding to a collaborative map.

We also had considerable success in working meaningfully with departments to help them create units and lessons that used the maps in subjects. These "transfer" lessons were almost always valued highly by staff and students. The goal was to demonstrate how a thinking tool could be used right across the curriculum—how it could be used for homework and study, in assessments, and to help make real-life evaluations of problems in context and make decisions.

Teachers began to see how useful a map was in eliciting prior knowledge. Students are now often asked to draw a map early in a lesson and then at the end of the lesson. By comparing the maps, students see and evaluate their own progress, thereby developing a sense of personal efficacy of themselves as learners. Metacognition and evaluation! Students also feel positive as they choose which maps to use when given a task. Secondary school staff members who initially were not enthusiastic about the maps because they said they had their own subject-specific processes became more positive when they saw that the maps could clearly reveal where thinking had gone wrong. All students benefited from this opportunity to analyze the merits of each other's thinking processes.

## YEAR 2: EVIDENCE OF INDEPENDENT USE IN 2000

In the second year, we were confident that students knew what a Thinking Map was (tacit use), but we were uncertain of the degree to which students used the Thinking Maps independently.

We wanted to know the extent to which students had moved from tacit use of Thinking Maps, to aware use or even strategic use. Students could use the maps when asked, but we suspected that they did it without clear intent. The challenge for the year 2000 was to gather evidence of the existing students' independent use of the Thinking Maps.

To determine the extent to which a fluent and "reflective" student use of maps occurred in problem-solving situations, we had students use their 20-minute thinking-skills time to collaboratively solve a long-term problem using Thinking Maps. For example, one teacher created a challenging activity on endangered animals playfully presented through a Gary Larson cartoon:

> Imagine you are a member of a team of researchers charged with reversing the population decline of the endangered "balloon" animals that have a hard time surviving in a harsh landscape. Use Thinking Maps as tools for generating, organizing, and assessing factors that might affect the population size of the balloon animals (e.g., physical factors, catastrophic events, food supply, disease, competition, ecotourism). Develop an action plan, based around your Thinking Maps, to help reverse the population decline.

The students' efforts were assessed, and prizes for fluent and flexible use of Thinking Maps were awarded. One group of four students created the example, shown in Figures 13.1–13.5, of using multiple maps to analyze this problem.

**Figure 13.1** Factors Affecting Size of Population of Balloon Animals

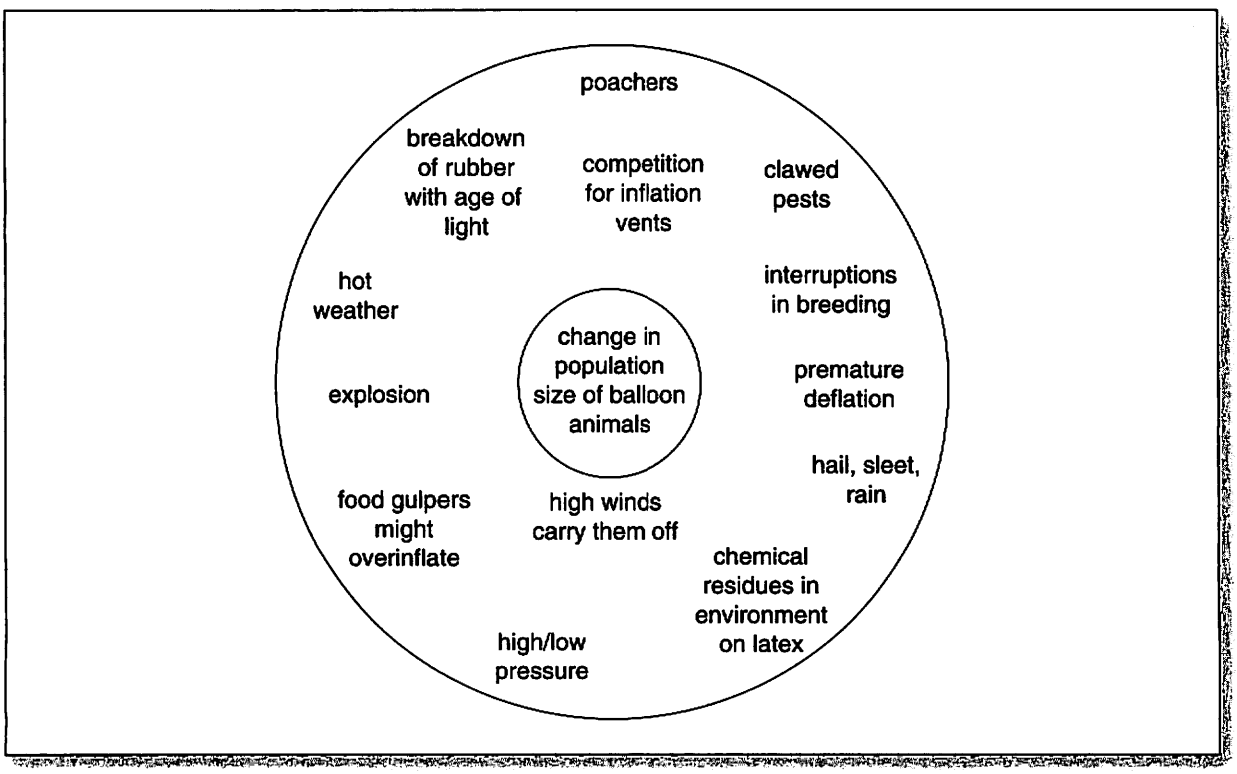


**Figure 13.2** Categorizing Factors Affecting Size of Population of Balloon Animals

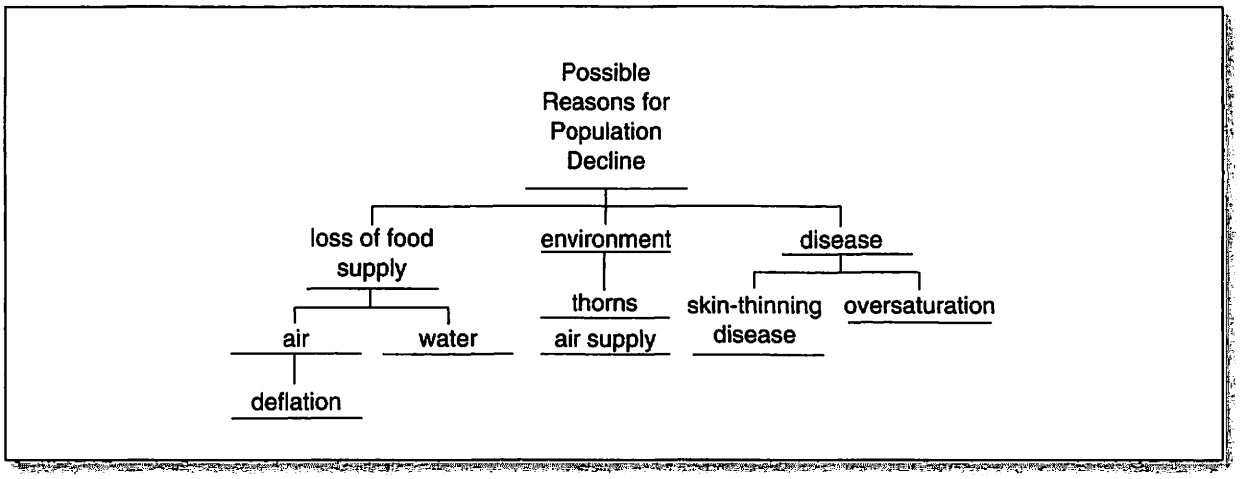
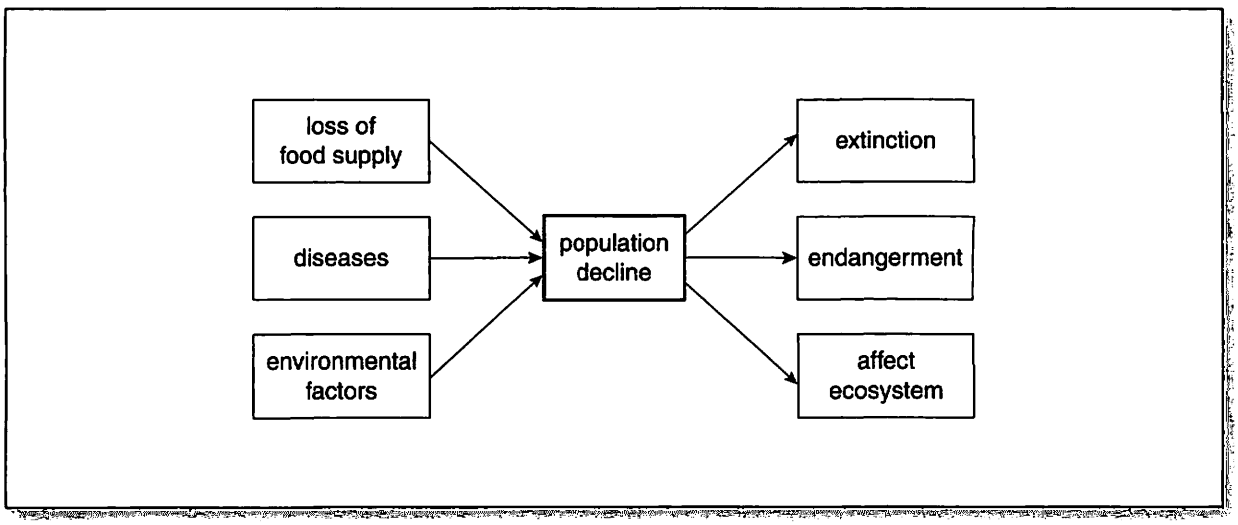



**Figure 13.3** Causes and Effects of Population Decline of Balloon Animals




The purpose of the activity was to evaluate how students, working in cooperative groups, could apply multiple thinking processes via Thinking Maps to gain a solution to the scientific problem found in cartoons and nature. This sample of student work is representative of the quality of work received and reveals how these students could employ the tools for multistep problem solving and decision making. Although some students showed strategic and even reflective use of maps, the majority still struggled to show the fluency we expected in their map use.

**Figure 13.4** Comparing Possible Solutions to Population Decline

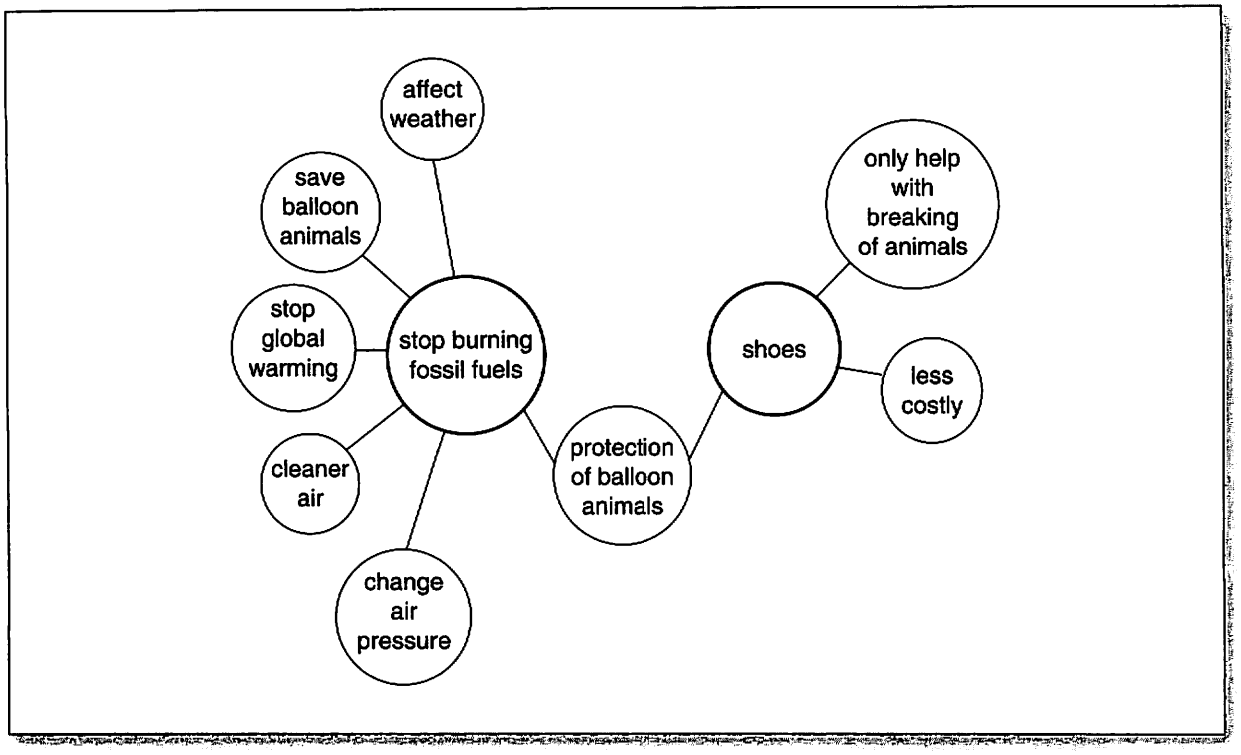
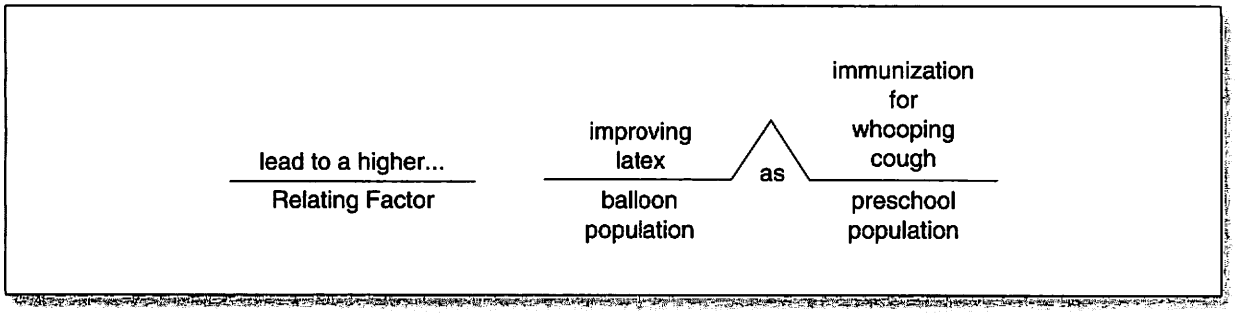



**Figure 13.5** Making an Analogous Relationship With a Possible Solution




## YEAR 3: REVIEWING AND MOVING FORWARD IN 2001

Our review of student applications revealed that there was still a need for more explicit teaching of these tools. The development of autonomous transfer of thinking skills does not happen over just a year or two. It happens during the evolution of a student's educational career and lifetime. Our evaluation of student map use in the year 2000 indicated that many

students and some staff were not as confident or competent in the use of Thinking Maps as we believed possible and necessary to reach the goal of being authentic, independent thinkers. We needed to revisit individual maps for fluency.

Though there was a risk of repetition for both teachers and students—the risk that many schools do not take for long-term change—we created a more authentic, thematic learning experience for senior students based on their reflections on the "Big Day Out," a 12-hour music festival that many students and their friends had attended. We also carried out in-school research during the year using a questionnaire to ask students about the maps they had used, about the subject areas in which they used different maps, if they had used maps to organize their thoughts in situations outside of school, and whether they believed their thinking had been developed through learning about Thinking Maps.

In the junior school, students were positive about Thinking Maps, had experienced their use in many different settings, and almost uniformly enjoyed using them to enhance their thinking both at school and at home. In the senior school, the results were predictable: Students who had experienced staff who valued the maps and provided opportunities for transfer into several different curriculum areas were positive about the usefulness of the maps and optimistic about map-related improvements in the way they solved problems or sorted issues. In contrast, students who had been provided with few opportunities to use the maps in curriculum areas or who had had teachers who avowed "grudging compliance" saw the maps, and the thinking-skills lessons, as "boring and a waste of my time." Without opportunities for transfer, senior students marginalized the maps and considered them pointless.

Once again, it was evident that teachers make the difference to the implementation and effective use of a learning strategy. In 2001, in the senior school, we also moved toward more departmental autonomy. Secondary departments were asked questions such as the following: What kinds of thinking do you most value in your department? What are the most powerful experiences to encourage this thinking for students? What Thinking Map activities will you use to develop these skills? How might you show the effectiveness and value of your thinking-skills focus for students' learning?

Departments were required to add their "thinking focus" to their departmental plan, and staff could choose to be apprised of this thinking focus. Individual departmental choice was interesting. The technology department chose to improve its students' metacognitive thinking through developing links between sequencing (Flow Maps) and the design process. The art department wanted to use maps to strengthen problem finding and metaperception. In social sciences, pattern finding was valued, with a focus on Flow Maps for sequencing and Double Bubble Maps for comparing and contrasting, and in the music department, there was exploration of the use of Brace Maps to better teach musical notation and intervals.

## YEARS 4–5: A COMMON LANGUAGE IN 2003

Through our continued focus and retraining, by 2003 we had achieved a common visual-thinking language across the school, with staff and student competence with the maps much increased. The Department of Thinking expanded to two full-time teachers supported by a team of staff. Examples of student use of Thinking Maps continued to be displayed in every teaching space. They were regularly used in assessments and curriculum lessons. In the secondary school, we saw more experimentation in flexible map use than in the early years, with several maps being linked and used to process a task. In the junior school, the majority of students showed fluent map use by Year 6, and students were adept users of the Thinking Map software (Hyerle & Gray Matter Software, 2007; see Chapter 10, "Thinking Technology").

Thinking Maps continued to be explicitly introduced in the junior school. However, after three years' implementation, the map knowledge base in the senior school was considered to be such that teaching of individual maps was only required for new students. Flexible catch-up training for new students and new staff was provided each year, and ongoing support from the thinking coordinators was provided on an individual and departmental basis.

By 2003, we were able to recognize some significant advances in the way the maps were being used, especially since St. Cuthbert's College had expanded its professional development time to one and a half hours a week. There was planned training for teachers in how to link the maps to other thinking or learning strategies. This encouraged students to use a wider range of strategies together to engage with the content knowledge. When several approaches are used together—such as linking Costa's 16 Habits of Mind with Thinking Maps—the emphasis on isolated tools lessens and changes to an emphasis on whole thinking and learning processes. It also extends the quality of the thinking involved. Here is a sampling of some of the spin-off benefits of our evolution. Teachers have been experimenting with the following:

- Developing a metacognitive lesson plan, where teachers identify a specific learning goal, and the questions they can ask students that will allow them to identify for themselves appropriate Thinking Maps to use.
- Encouraging greater infusion by creating intranet-based learning activities. Students can call up a page of lesson activities available for a task, click on a hyperlink, and be presented with a range of links to higher-order thinking, Thinking Maps, and multiple intelligence–differentiation activities. They can then download these directly into their responses.
- Encouraging flexible use by having a school-wide focus on "applied thinking," where a philosophical real-life problem is analyzed using the maps and inquiry techniques.

These examples reflect the inherent rigor and flexibility of Thinking Maps and the empowering nature of the change process that was allowed to mature naturally over time. The learning outcomes for our students based on fundamental thinking processes and learning approaches have been remarkable. Academic results in New Zealand's national league tables have risen consistently, with the college a national academic leader, placing 1st or 2nd in New Zealand in every senior external examination category for the past five years, up from 12th at the start of our evolutionary process. We have also seen improved results on international tests and PATs (reading, listening, and comprehension tests), the high level of acceptance and approval from students and parents, and the continued use of double processing using the maps and linear writing from our students who now attend universities.

Yet the most powerful outcome has been the move to collaborative and interactive classrooms where students—and teachers—are confident to discuss their learning and to learn from each other. We now know that students are much more willing to share their work with the class when it is developed visually, collaboratively, and through a flexible, common language for thinking that is the foundation for the evolution of our community. And, as teachers and school leaders, we are able to work deeply in our own content areas, with focused collaboration in teams. After 10 years, we are still living the never-ending ebb and flow of change and thriving as an evolving school as a home for the mind.

## REFERENCES

Bloom, B. S. (Ed.) (with Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R.). (1956). *Taxonomy of educational objectives: Handbook: Cognitive domain.* New York: David McKay.

Costa, A. L. (1991). *The school as a home for the mind.* Palatine, IL: IRI/Skylight.

Costa, A., & Kallick, B. (2000). *Activating and engaging the Habits of Mind.* Alexandria, VA: Association for Supervision and Curriculum Development.

Hyerle, D., & Gray Matter Software. (2007). *Thinking Maps* (Version 2.0, Innovative Learning Group) [Computer software]. Raleigh, NC: Innovative Sciences.

Perkins, D. N., & Salomon, G. (1989). Teaching for transfer. *Educational leadership, 46*(1), 22–32.

Swartz, R. J., & Perkins, D. N. (1989). *Teaching thinking: Issues and approaches.* Pacific Grove, CA: Midwest.