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**Learning &
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ASSOCIATION FOR SUPERVISION AND
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(SINGAPORE)



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LEARNING & METACOGNITION

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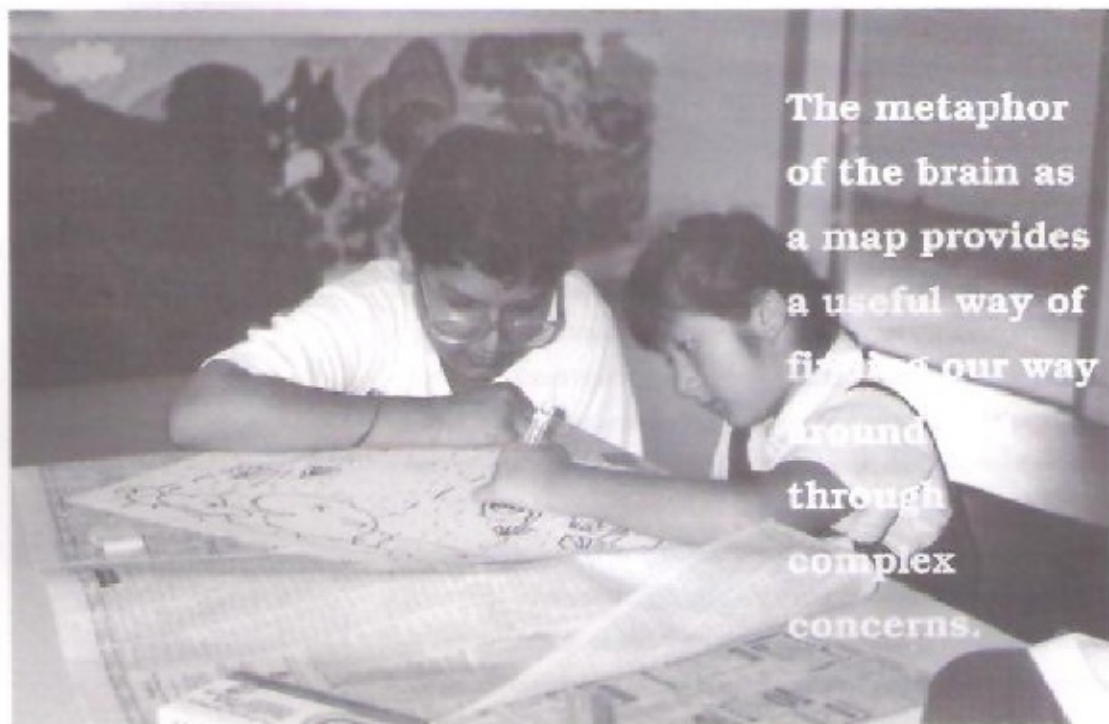
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METAPHORS OF THE MIND

Robert Sylwester

We tend to shift to metaphors whenever we confront the incomprehensible. It gives us a sense of what the phenomenon is *like*, rather than what it *is*, which may be as close as we can often get to real understanding. Unfortunately, our metaphors sometimes get in the way of genuine understanding.

The common computer metaphor for our brain is a good example. It has given us a distorted understanding of our inventive, adaptable, exploratory brain – the notion that it is rather principally efficient, logical, programmable, machine-like. The metaphor has thus powerfully affected our patrons' expectations of what schools can and can't do. Still, metaphors, like maps, provide a useful way of finding our way around and through complex concerns, and so we use them.



Several brain metaphors (in addition to the computer metaphor) have flourished within our profession over the years. The early right/left hemisphere discoveries led to the metaphor-rich Learning Styles Movement; and Paul MacLean's anatomically-oriented Triune Brain Model evoked comparisons with such other trinities as Father/Son/Holy Ghost, Id/Ego / Superego, and legislative/executive/judicial.

The concepts of *climate* and *weather* suggest yet another (atmospheric) metaphor for thinking about two of our brain's principal properties – stability and fluctuation.

Climate provides a sense of the expected. An average day will probably bring sun to the desert and rain to the forest. Weather, conversely, is what occurs on any given day, and so weather may deviate considerably from climate – a downpour in the desert, a sunny winter week in the forest.

Stability and fluctuation are important concepts in a complex system. Statistical graphs use measures of central tendency and range to report normative stability and fluctuations, and computers have default procedures that automatically engage unless a specific command is given to override. For example, unless I specifically command it to deviate, my printer will print this text single space with a one inch margin and 12 points New York type. Are stability and fluctuations also important to a brain?

Stable Cognitive Factors

Our brain must take care of far more body/brain processes than it can consciously regulate at any given moment. Examples: Processes such as circulation and respiration are designed to function automatically and continuously. We may consciously decide to make a movement, but we rarely consciously control the resulting muscle movements. Our temperament and personality emerge very early in life and provide us with a stable preferred way of responding to many of life's challenges. Intelligence, long-term memory, and our native language are other cognitive properties that exhibit considerable predictable

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stability over time. We can thus think of cognitive stability as our brain's climate, the cognitive default system that reduces conscious decision-making in many areas.

Fluctuating Cognitive Factors

Efficient stable systems free our conscious brain to focus on and quickly and decisively respond to important unpredictable challenges, such as predatory dangers and fleeting opportunities for food. Our emotional and attentional systems are thus designed to play a critical role in determining whether or not to fluctuate from the stable and to expend a lot of energy on responding to a sudden challenge. Examples of important fluctuating systems are various body/brain cycles (such as menstrual, sleeping/waking, and hunger cycles) and the onsets of puberty and aging. Our short-term memory is another system that allows us to hold a small amount of information for a short period of time without adding it to our permanent memory bank. Our stress mechanisms represent a major fluctuating system that can suddenly mobilize our entire body.

We can thus think of cognitive fluctuations as our brain's very changeable and often explosive weather. Much of our brain's energy is held in reserve for crisis conditions. It's similar to a car on cruise-control that reserves much of its energy for a sudden acceleration to pass another car or for sudden braking to avoid an accident.

Educational Applications

What works in a brain also works within a school. School stability emerges through routines and rules that reduce the number of conscious decisions that would otherwise bog down the system. We also see it emerge as students gain automatic mastery over such skills as reading and arithmetic.

Such stable systems allow staff and students to insert the stimulation of fluctuating emotional and attentional energy into the day's events – to successfully expend a lot of learning energy on problems that don't have an automatic response.

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Jean Piaget defined intelligence as what we use when we don't already know what to do. This suggests a focus of our conscious cognitive energy on fluctuating challenges and not on mundane stability – but realizing that a stable system makes the focus possible.

The two systems thus combine to allow a brain and a classroom to effectively and simultaneously respond to simple and complex challenges. Climate without weather would be boring. Weather without climate would be confusing. An appropriate balance makes life interesting – in life and in school. The challenge for educators is to find an appropriate balance.

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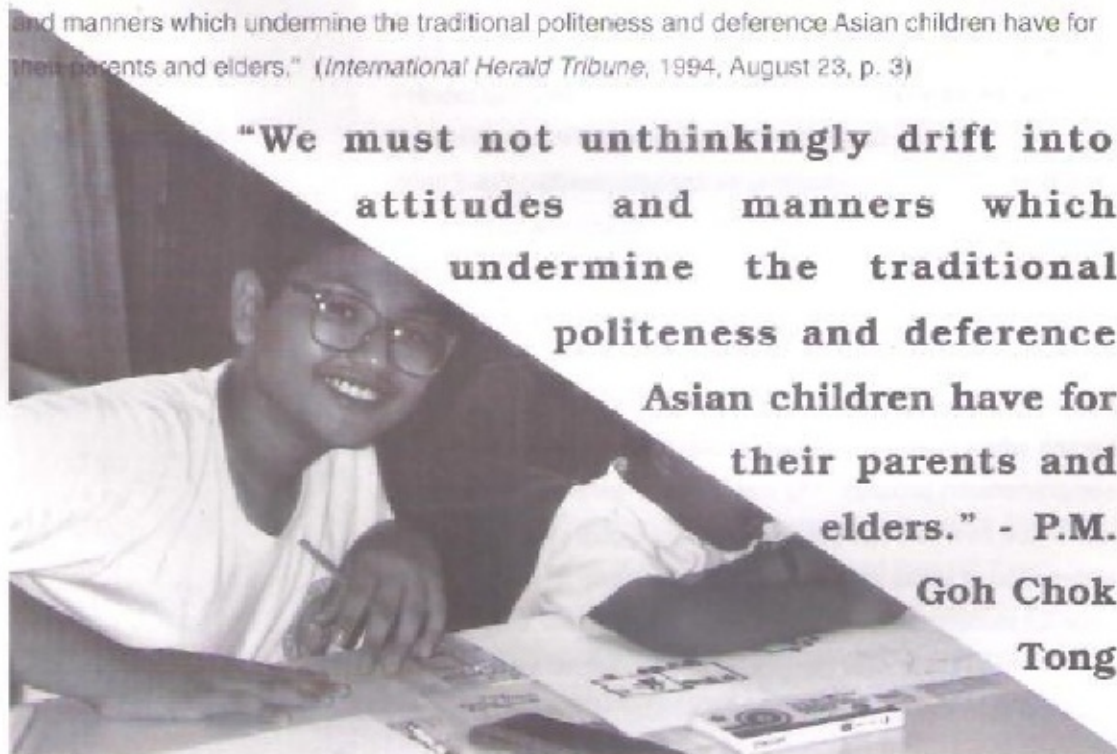
THINKING FOR CRITICAL LITERACY IN THE PRIMARY CLASSROOM

Christina Hvitfeldt

I recently gave a paper at a regional seminar in Singapore on the need for introducing argumentative thinking, a vital component of critical literacy, into the primary school language arts programme. During the discussion period which followed, participants from Singapore, Malaysia, India and Indonesia expressed concern that Asian parents and teachers, most of whom expect children to be obedient and deferential, would not welcome such an emphasis in the classroom.

Becker (1991) suggests that this negative attitude toward argumentation in the school setting is at least partially due to the fact that age has generally been equated with authority within Asian traditions. Goh Chok Tong, Prime Minister of Singapore, expressed the view of many parents and teachers when he stated in a recent speech: "We must not unthinkingly drift into attitudes and manners which undermine the traditional politeness and deference Asian children have for their parents and elders." (*International Herald Tribune*, 1994, August 23, p. 3)

"We must not unthinkingly drift into attitudes and manners which undermine the traditional politeness and deference Asian children have for their parents and elders." - P.M. Goh Chok Tong



Becker also suggests that within traditional Chinese culture, argument is to be avoided because it requires direct confrontation. "Taking opposite sides of an argument necessarily meant becoming a personal rival and antagonist of the one who held the other side If one did not wish to become a lifelong opponent of someone else, he would not venture an opinion contrary to the other person's opinions in public." (p. 236)

Clearly, reading and writing and the ways in which these acts are understood reflect the cultural values and the everyday needs of a society. Langer (1993) calls literacy culture-specific, suggesting that "there is no right or wrong literacy, just the one that is, more or less, responsive to the demands of a particular culture." (p. 201) When a society changes, it is natural that its literacy will need to change as well in order to adapt to new requirements. This is apparent throughout Asia, where the demands of the workplace are rapidly changing due to new technologies and sophisticated information systems. To respond to these new demands, schools are increasingly called upon to put greater emphasis on critical literacy, logical reasoning, problem solving and flexible thinking, skills that are becoming necessary even in entry-level jobs. During a recent interview, Mrs. Kam Kum Wone, Director of Research and Testing for Singapore's Ministry of Education, stated that "our students are very good in memory work and answering recall kinds of questions. But generally, they perform less well in questions that require reasoning or analytical skills. We should build on critical thinking skills. Teachers will have to think of approaches to get our students to think more, analyze more." (*The Sunday Times*, 28 August 1994, p. 14)

Applebee, Langer & Moll (1985) suggest that critical literacy begins when students take an active role in the reading comprehension process. "To foster higher-level literacy skills is to place new and special emphasis on thoughtful, critical elaboration of ideas and understandings drawn from the material students read and from what they already know. They must learn to value their own ideas and to defend as well as question their interpretations in face of alternative or opposing

"there is no right or wrong literacy, just the one that is, more or less, responsive to the demands of a particular culture"

They must learn to value their own ideas and to defend as well as question their interpretations in face of alternative or opposing points of view

points of view.” (p. 8) Norris (1985) emphasizes that, above all, “one must have the disposition to think productively and critically about issues, or else no amount of skill in doing so will be helpful.” (p. 40)

The question which remains is whether educators really want their students to think, to question and to argue in defense of their opinions. In most classrooms, teachers continue to favour the children who sit quietly, don't ask too many questions, accept as truth what they are told and give the expected answers. Many teachers express concern that their authority will be undermined if children are encouraged to become more critical and questioning, having concluded that teaching for 'critical literacy' and maintaining 'traditional values' in the classroom are incompatible. Yet I believe that teachers can help students develop their own interpretations of what they read, elaborate upon the ideas and information they draw from their reading, and put forth reasons to defend their points of view in ways which are culturally acceptable. We can help our students to develop critical literacy, including argumentative thinking, using methods which emphasize discussion and collaboration and minimize confrontation.

Critical literacy through stories

Fisher (1987) calls a good story “a kind of investigation, an adventure in thinking and imagination” and claims that “all stories need thinking about, need to be recreated in our own imaginations. The response we have to stories tells us as much about ourselves as it does about the story; it offers us clues about our own lives.” (p. 42) He suggests that fairy tales, in particular, appeal to children because they often have turning points where the main character must make crucial decisions that seem to be wrong at the time but somehow turn out right at the end.

In *Sleeping Beauty* one of these turning points concerns the decision of the parents — should they tell their daughter about the danger of spinning wheels in the hope that she will avoid them, or should they not tell her and simply destroy every spinning wheel they can find?

This is the sort of question that can fruitfully be discussed at all ages, and one that can be applied to many of life's dangers. In *Jack and the Beanstalk*—would you have swapped a cow for a handful of magic beans, or climbed a beanstalk into the sky? In *Hansel and Gretel*—how would you have found your way out of an unknown wood, and would you go into a stranger's house even if it was made of sweets? There is a wealth of material in traditional tales to stimulate discussion and problem solving. Could you, like the *Three Little Pigs*, build houses out of straw, wood and brick and how would they stand up to the wolf's fierce breath? How would you have raised the *Enormous Turnip* from the ground? How would you have rescued *Rapunzel* from the Tower?" (p. 44)

The response we have to stories tells us as much about ourselves as it does about the story; it offers us clues about our own lives

Whatever the story, class discussion which encourages young children to share the thoughts and emotions that their reading has aroused stimulates thinking and enriches the reading experience. Speculating about alternative ways to solve the characters' problems provides an opportunity for children to produce ideas, provide reasons, explore implications and predict outcomes. It also provides a springboard for writing.

Commeyras (1993:489) describes the use of Dialogical-Thinking Reading Lessons in which students read and discuss a story that contains an issue or question that can be considered from more than one point of view. For Sheila Greenwald's *The Hot Day*, for example, the teacher wrote the following on the chalkboard:

Central question: Why did Mr. Peretz run away and never come back?

Side A: Mr. Peretz was scared.

Side B: Mr. Peretz was angry.

The students were then invited to choose one of the positions and explore reasons to support it. They came up with the following:

Side A: Mr. Peretz was scared.

1. Because he thought they were ghosts.

2. Because he thought a bomb went off.
3. Because the children yelled at him.

Side B: Mr. Peretz was angry.

1. Because the children broke into his room and made it cold.
2. Because the children came into his room without permission.
3. Because the children wasted talcum powder.

Class discussion then centered on which reasons were true, which were relevant, and which provided the strongest support for the conclusion. Finally, the children were given an opportunity to say what they believed as a result of all the thinking they had done on the topic, either orally or in writing. Commeyras suggests that children always be allowed to say they have not made up their minds, as knowing when to withhold judgement is an important element of critical literacy.

Mohr, Nixon & Vickers (1988) maintain that a good way to give upper primary children meaningful opportunities to participate in activities that require higher-order thinking skills is to use their favourite books. Their *Thinking Activities for Books Children Love* contains discussion guides for fifteen books chosen as favourites by children in Primary Three through Six. Each guide contains chapter questions which focus on knowledge, comprehension, application, analysis, synthesis and evaluation. The guides present an organized sequence of thinking activities that can be used with the whole class, small groups, paired or independent readers. The guides also encourage creative problem solving, as in the following pre-reading question on Sheila Burford's *The Incredible Journey*:

A Siamese cat, an old bull terrier, and a young Labrador retriever attempt to travel back home over three hundred miles of Canadian wilderness. They have been purely domestic animals never even attempting to hunt their own food. What will they have to do to be successful in reaching their destination? (p. xiii)

A good way to give upper primary children meaningful opportunities to participate in activities that require higher-order thinking skills is to use their favourite books

The chapter guides for each of the fifteen books provide excellent models for the formulation of questions which demand various levels of thinking. The questions can be used in a variety of ways for discussion or for writing.

Another approach is taken by Matthew Lipman and his colleagues at the Institute for the Advancement of Philosophy for Children, who have produced a series of children's story books and teachers' guides to help children develop cognitive skills within a reading, reasoning and language arts programme. The beginning book, *Pixie* (Lipman & Sharp, 1989), is geared to a Primary Three reading level. It begins:

Now it's my turn! I had to wait so long for the others to tell their stories!

I'll start by telling you my name. My name is Pixie. Pixie's not my real name. My real name my father and mother gave me. Pixie's the name I gave myself.

How old am I? The same age you are. (p. 4)

The teachers' guide for *Pixie* (Lipman & Sharp, 1989) provides discussion questions and exercises to stimulate thinking about each chapter. The discussion plan for chapter one focuses on names and includes the following:

1. Do you have more than one name? Explain.
2. Do your parents call you by the same name as your friends call you?
3. Do you use your name when you talk to yourself?
4. If you didn't have a name, would it matter to you?
5. If you had a different name, would it matter to you?
6. If you had a different name, would you be a different person?
7. Can you think of a name you would rather have than the one you have?
8. If people wanted to, could they re-name everything in the world?
9. Can people's names be bought and sold?

To foster higher-level literacy skills is to place new and special emphasis on thoughtful, critical elaboration of ideas and understandings drawn from the material students read and from what they already know

10. Is it possible that, as people grow older, they get to look more and more like their names? (p. 4)

The teachers' guide provides good models for the development of questions that have no single correct answer. These questions give children an opportunity to develop their own opinions and come up with reasons to support their points of view either orally or in writing.

Critical literacy through talk about thinking

An important part of teaching for critical literacy is helping children become responsible for their own thinking. To help them become aware of their own thinking and that of others, we need to teach them how to *talk* about thinking. Fisher (1987) suggests that talking about thinking can help children to avoid some of the following problems:

- errors of perception (it's right because part of it is right)
- egocentric thinking (it's right because I think it is right)
- trusting first judgments (it's right because it looks right)
- trusting others' judgments (it's right because he/she says so)
- distrusting others' judgments (it's right because you're wrong)
- errors of logic (faulty arguments, arguing from the irrelevant) (p.12)

An important part of teaching for critical literacy is helping children become responsible for their own thinking

In order to engage in critical literacy, children must learn to recognize their own biases. We can help students to see what they already know by encouraging them to share ideas through discussion and develop criteria for evaluation of their opinions through collaborative group work. Block (1993) contends that group work is particularly important in the development of critical literacy because it provides students an opportunity to talk about reasoning and, in doing so, uncover their own metacognitive processes. She suggests that group collaboration helps students to identify their own errors in reasoning by giving them the chance to see how their reasons differ from those of their peers. Students are then in a position to develop strategies to 'repair' their thinking.

Critical literacy through reflective writing

Although the writing of narratives is the most common form of writing in the primary school, children should also be encouraged to use writing to explore their thinking and develop their abilities to reason and solve problems. This kind of writing demands processes such as abstracting general principles, making inferences and deductions and speculating on possible causes, effects and reasons. To provide opportunities for this kind of thinking and writing, Fisher (1987:71) recommends questions which prompt speculation, such as:

What if . . . plants started to walk?
you were turned into a frog?
the oceans all dried up?
you were really given three wishes?
you were allowed to run the school?
you discover your best friend is a thief?

Bicknell (1987) suggests the use of "Think Books," in which children are encouraged to write about their own concerns and ideas. In his experience with middle primary students, Bicknell has found that they most often write about the things they don't understand or have just discovered. He offers the following example from the Think Book of Alan, age ten:

I don't understand why black people are black and white people are white. I think it might be because when we were cave men that some of them lived in hot parts of the world and others lived in cold parts but I thought that the world was cold then, so why are some people different colours to other people? (p. 66)

In addition to encouraging writing about thinking, Think Books provide opportunities for teachers to suggest to children how they might go about finding answers to the questions they raise, helping them to develop strategies for problem solving.

In order to engage in critical literacy, children must learn to recognize their own biases

Block (1993) suggests that biography and autobiography can be used to good advantage in the development of critical literacy. She recommends that children read about famous people who were born on their birthdays, then discuss or write about what it would have been like to have been that person's best friend. The students then write their own autobiographies, using parents and grandparents as sources of information. Next, the children pair up with a friend and each writes a biography of the other. When they compare the autobiographies to the biographies, the children are asked to explain the differences between their own perceptions and the perceptions of others and the consequent differences in the autobiographical and biographical genres.

Conclusion

To help students develop the critical literacy skills they will need to meet the demands of a changing world, we must encourage them to think for themselves. We can begin by asking them to reflect upon their own ideas and present those ideas to their peers. We can promote thinking by asking questions which require students to examine their assumptions or extend their thinking into new areas.

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When discussing stories, we can ask questions to help students interpret information and generate hypotheses. We can ask them to state opinions, give reasons for those opinions and come up with criteria for evaluating their reasons. We can talk about thinking and help students to monitor their own reasoning. When students write, we can encourage the thoughtful elaboration of ideas, the consideration of cause and effect, and the application of principles to new situations. We can do all this in an atmosphere of collaboration, where children work together to reason things out.

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MAXIMISING LEARNING

A CONVERSATION WITH RENATE NUMMELA CAINE

Carolyn R Pool

What do the neurosciences, biology, and psychology teach us about what our schools should be like? How can we change our mental models of education to meet the needs of children? Renata Caine answers these difficult questions in exploring how children learn.

In Making Connections and Education on the Edge of Possibility, you and Geoffrey Caine discuss principles of brain-based learning. Some people might say, "Well, of course, we learn with our brains - so what else is new?" But you and Geoffrey have connected the latest cognitive and neurological research to education. What is new? What is the most significant finding that relates to what we do in schools?

Humans have a marvellous brain, whose possibilities appear endless.



We debated about using the term brain-based learning because, of course, all learning is brain based. But if we just said "learning" then people might not understand what we were talking about, either. Humans have a marvellous brain, whose possibilities appear endless. So when we refer to brain-based learning, we are concerned about maximising learning - understanding how the brain works best - and we have encapsulated our findings into 12 learning principles that emphasise the connections and patterns our brains make (see Fig 1). Our current studies are taking us into the great impact that early childhood development has on the way children learn. These findings have enormous implications for schools - even preschools - because so many neurological pathways critical for later life are laid down from age zero to age 3. These pathways affect the way children interact with formative experiences during their later developmental stages. These patterns also include children's beliefs about themselves and their world, which continue into adulthood.

In your work, you discuss threats that inhibit learning.

What are these threats? What happens to learning when we feel threatened?

Many children's lives are filled with threats to learning - child abuse, poverty, malnourishment, family and community violence. These are devastating experiences for the child - and for the human brain. These experiences can program the child to effectively live in anticipation of such experiences. Children who have lived with extreme threats develop perceptual loops; they look for certain signals in the environment that to some extent replicate their own experiences. Their brains are not programmed to help them cope in a healthy way. When we feel threatened, we downshift our thinking. Downshifted people feel helpless; they don't look at possibilities; they don't feel safe to take risks or challenge old ideas. They have limited choices for behaviours.

What does downshifting mean for teachers?

We define downshifting as the psychophysiological

when we refer to brain-based learning, we are concerned about maximising learning - understanding how the brain works best

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response to threat, accompanied by a sense of helplessness or fatigue. The downshifted person experiences a sense of fear or anxiety, not the excitement of a challenge. Downshifting is accompanied by a feeling that you cannot access your own ability to deal with the situation. Downshifting can result from very drastic conditions in early childhood, as I mentioned; but what we're seeing is that, to a lesser degree, downshifting is everywhere in the schools.

Do children face threats in school?

Yes, but here we're not talking about traumatic threats like guns in school. We are concerned about emotional threats to higher-order thinking and learning. The system of traditional education can be a threat that inhibits higher levels of learning. If as a teacher I am in charge of the curriculum, you as the student are supposed to learn what I say you must learn. I know the answers that you have to get. I'm also going to tell you how long it will take you to learn this and when it's due. And not only that - I evaluate you and your work. In this approach, where is your input? Where is your self-efficacy? And what are you learning but compliance? So students are doing what teachers want them to do. And downshifted people can do some things well, like memorising, because the brain perseverates under threat and likes to do things over and over again - repetition provides a sense of safety when you feel helpless. Memorisation is compatible with traditional teaching. But real learning - making connections, higher-order thinking, and creativity - is incompatible with that kind of environment.

What are some examples of strategies that are compatible with brain-based teaching and learning?

Let me give you an example that shows how teachers faced a challenge that they first perceived as a threat. Geoffrey and I were working with teachers beginning to use a rich, brain-based approach to learning to read and write. The

district suddenly mandated its own literacy programme. All the teachers dropped the brain-based approach; they abandoned their new understanding of learning - they just implemented the district's mandates. They were frightened; they did not have the self-efficacy they needed. In the mandated programme, the students were scheduled to do unrelated tasks and drills every day. Soon, kids began to ask, "Why are we doing this? This isn't fun and we're not learning anything!" Geoffrey and I also asked, "Why are you doing this?" Basically, the reason was fear; the teachers felt helpless in dealing with the district - they downshifted.

We encouraged the teachers to examine the literacy programme and start incorporating it into what they knew about the human brain. The teachers then said, "Okay, what do we know about learning? We understand that children need to be in a community. They need to follow their own interests, and we need to constantly question and challenge them." The teachers began to see that brain-based learning moves away from what you do on Monday morning to how children learn. They began to see that brain-based learning is not limited to one approach or strategy.

In the process, the teachers took the best from the district's programme - but they also took the best out of Reading Recovery, whole language, and phonics. They began seeing kids in kindergarten and 1st grade doing critical thinking and analysis. As a result, this school has gone from the second from the bottom in reading in their district to the second from the top.

What are some ways that a brain-based approach to, say, language arts, might differ from a traditional approach? I remember being intrigued by your discussion in *Making Connections* of relaxed alertness, orchestrated immersion, and active processing as conditions for learning.

Well, you cannot really separate these conditions. Relaxed alertness means "low threat, high challenge." If

The teachers began to see that brain-based learning moves away from what you do on Monday morning to how children learn. They began to see that brain-based learning is not limited to one approach or strategy.

If children are to think critically, they must feel safe to take risks.

children are to think critically, they must feel safe to take risks. And if the teacher insists on one correct answer and is going to evaluate them, children are not foolish. They will give the answer the teacher wants. But for making connections and actually changing their thinking on the basis of accrued knowledge, they need relaxed alertness - that is, safety and challenging learning experiences.

As for orchestrated immersion, children learn best if they are immersed in complex experiences and are given the opportunity to actively process what they have learned. The best learning happens when necessary facts and skills are embedded in experiences that relate to real life, when there's a big picture somehow.

Can you give an example?

Even though many teachers creatively use *haiku* and other forms of poetry that appeal to students, most teachers approach poetry as a subject to cover. Many children don't understand or *feel* poetry. One teacher using a brain-based approach to language arts decided to turn her whole classroom into a coffeehouse. The kids helped set it up - low lights, candles on the tables, tablecloths, music playing softly. The teacher asked adults from the school and community to come in and read their favourite poetry and talk about it. Through this complex experience, the teacher gave her students a sense, or felt meaning, for what poetry is and that it is valued by adults in the real world. Teachers can do the same thing in science and math.

What would be an example of brain-based science or math?

In science and math, teachers and students might ask natural questions like "What happened?" "How did you do this?" "What happened when we added this element?" and "How else might this have worked out?" They ask critical questions that are not necessarily in the book or worksheet. Take the "owl pellet" lesson, for example.

Owl pellets are material that owls regurgitate after they eat.

The pellets include the bones and furs of rodents and birds the owls consume. In a science lesson that I was observing, students pulled some owl pellets apart and then answered worksheet questions about what owls eat. I walked around this classroom and asked another question: "You know, I'm wondering - how does an owl's stomach know how to separate the meat from the bones?" This was a genuine question. And the students looked at me as though I were crazy because that question was not on the worksheet.

A teacher asking real, live questions provides rich possibilities for students. But for these possibilities to become reality, teachers need to shift their thinking about teaching and learning. They also need extensive resources, including technological support. Brain-based learning is wonderfully compatible with technology.

Your examples remind me of some good teachers I've had. My 9th grade chorus teacher took our class to many concerts, shows, and competitions. Her bubbling enthusiasm for all sorts of music, from gospel to folk to classical, stays with me to this day. What suggestions do you have for teachers to improve their own practice?

In our recent work, we found three distinct styles of teaching. In the first instructional approach, the teacher is in charge, using traditional strategies like lecturing, memorisation, testing - the old factory model. When you speak of relaxed alertness or orderliness to teachers who are dedicated to this approach, they tend to think in terms of good discipline, of going along with the teacher's plan. Orchestrated immersion might consist of a teacher's bringing in some World War II artifacts to introduce a lecture, or allowing students to ask questions of a guest speaker.

In the second approach, the teacher is comfortable with many innovative learning strategies and sees new possibilities for defining discipline, but still largely directs student learning. We have found that more and more teachers are moving to the second approach,

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though most teachers still operate from the mental model of the traditional approach to education, because that was the way they were taught.

In the third (and rarest) instructional approach, which is actually brain-based teaching, learning becomes collaborative - teachers and students have much more mutual responsibility. Here, students know what they want to do, time parameters are flexible, and orderliness and coherence prevail. Teachers have an extensive repertoire of strategies. These classrooms are characterised by ongoing questioning and analysis. Students and teachers ask experts, they get on the Internet, they learn together.

That reminds me: I heard of a new programme called STTC - it stands for Students Teaching Teachers about Computers.

I like that. Students are often much more comfortable with the third instructional approach. On the other hand, some students are so used to the traditional factory model that they are initially confused when they encounter brain-based teaching. And it is difficult for some parents to understand that the traditional approach to teaching is no longer going to prepare their children for the future. But five years from now, if I were a parent and I still saw my children sitting in a classroom with desks in a row and a teacher up front, I would panic because that will absolutely be inappropriate.

What if parents disagree with what you're doing and insist on a certain type of curriculum?

Parents need to be brought into the educational community wherever possible. Orderliness depends on constant communication among teachers, students and parents. But for parents who fundamentally disagree with the rest of the community, charter schools are a real possibility. Parents can create their own schools, organised around their own purposes and meanings. Private and religious schools can also meet some of these needs, though I am not in favour of vouchers. Acknowledging and celebrating diversity - in a democratic community - is an important outcome of principle 12, "Every brain is uniquely organised."

Speaking of diversity, what is your view of multiple intelligences?

We all have different talents, skills, perspectives, and intelligences. We need to encourage children's gifts in two ways. First, we need to acknowledge diversity; second, we need to focus on our commonalities, what makes us human and what ties us to the rest of nature.

So Geoffrey and I agree with the basic premise of multiple intelligences. But how is it used in the classroom? Do teachers simply incorporate variation into traditional presentations? Or do they address multiple intelligences by providing complex experiences within which students can use their individual intelligences (expanding into other types of skills and modes and benefiting from other people's intelligences)? Interaction and complexity are key.

In a recent article, Bob Sylwester discusses neurological research concerning the effects of serotonin on self esteem - not only through drugs like Prozac, but by positive social feedback students get from portfolios, cooperative group learning, and nurturing from caring adults. Where does brain-based learning fit in this picture?

On the whole, I would tend to agree with Bob about the importance of positive social feedback and the benefit of the strategies he mentions. But here, again, we must consider developmental learning and the effects of downshifting on children's ability to become self-motivated, to believe in their own capacities and abilities. We have suggested that the opposite of downshifting is self-efficacy.

I think we need to be very careful that we do not depend on Prozac and other psychotropic drugs for other than temporary assists, particularly for downshifted people who have difficulty in ascribing any success to their own efforts and who are easily influenced by others. There seems to be a real danger here. How can I believe in my own strengths and initiatives when I know that a drug has changed my behaviour? I know

We need to encourage children's gifts in two ways. First, we need to acknowledge diversity; second, we need to focus on our commonalities, what makes us human and what ties us to the rest of nature.

I am pleading for the exploration of other ways to enhance children's self-esteem and self-efficacy, such as by removing threats from our classrooms, and making them safe, challenging places for children to learn. This should be the focus of education.

that Bob is not advocating the use of Prozac with children - I am pleading for the exploration of other ways to enhance children's self-esteem and self-efficacy, such as by removing threats from our classrooms, and making them safe, challenging places for children to learn. This should be the focus of education.

In *Education on the Edge of Possibility*, you and Geoffrey describe your work with two elementary schools in implementing brain-based teaching. What was this process like?

Shifting out of an exclusively traditional instructional approach is difficult. Our book relates the challenges and setbacks the schools faced. First, I want to recognise all the teachers who use traditional approaches really well. It's not that their work is wrong; the times are changing on us. Our knowledge base is changing, with new information from the neurosciences and biology and technology. We're living in a different world. There's so much for us to understand, and we can't do it by getting what I call "surface knowledge" - what somebody else tells us is important to learn.

Second, to change our mental models, we have to address how our own brains learn - and immerse ourselves in interactive, real-life, complex experiences out of which we can process new ideas. To help teachers change their mental models, we found that using "process groups" was critical.

What is a process group?

We encourage teachers to get together in small groups and look at new information from the sciences, examine educational research, and study the brain/mind principles - as people, not just as teachers. They asked questions like "What does it mean that the brain is a complex, dynamic system?" Then they began to reflect on how their own practices did (or did not) maximise learning. The groups included not only teachers but also custodians, librarians, and other nonteaching staff, in an attempt to arrive at common beliefs, purposes and values - the foundation for

orderliness. They all shared ideas on how to create a school and environment based on how children learn. The groups came up with their own solutions to the "time and energy" problems that plague many other reforms. How can we allow time for complex experiences when we have to cover the curriculum? Do children really learn best in 50-minute increments? Where do we get planning time? A supportive administration and funding arrangements gave the groups time to constantly rethink and enrich what they were doing in school - and this work is ongoing. We see no other way to produce effective change in schools - there's no top-down way to teach a new mental model. It has to come from the educators themselves.

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Our knowledge base is changing, with new information from the neurosciences and biology and technology



SCHOOL IS ABOUT LEARNING?

Low Guat Tin, Yeap Lay Leng

How can one ever doubt that school is about learning. That's what schools are set up for—to help each child to learn and to help him/her to maximize his/her potential. If school is all about this then how will we address a section of the school population who resist learning? Many teachers will tell us of pupils in their classes who are not interested in learning—they come “unwillingly to school”. In fact many would prefer to spend the day in shopping malls.

Many pupils spend hours reading, writing and listening in class with growing resistance and in some cases even with resentment. Using the carrot and stick techniques do not seem to work. And teachers are constantly taught motivational techniques to “entice” or “seduce” their pupils to learn. If school is about learning then surely school administrators and teachers should be concerned about ways to create a climate where pupils will feel the need to learn and also want to learn. How can we build more hospitable schools?

Structurally the newer schools in Singapore are very impressive, so how can we add excitement and a vibrance to match with the often posh structure?

How can teachers make the class more hospitable? I must state at the outset that it is not easy for teachers to create a more hospitable class because the demands made of the teacher is enormous. Teachers have become “part of a very demanding, punishing and often exploitative society in which personal growth and development have become secondary to the ability to produce and earn credits” (Nouwen, 1975). The result is that schools demand more from their students, lengthen the school day, provide remedial classes, punish the recalcitrants who do not do their homework



and forget about self-concept, emotional stability, motivation and such “soff” issues. Schools are ranked, teachers are ranked and the concern for many is how to be within the top ranks. There is also a belief that creating a conducive learning climate or becoming more hospitable and ranking are at cross purposes. In other words, if schools become more humane, the grades of the students might drop. School therefore should emphasize academic excellence and not be overly concerned about “non-essential” issues.

I would like to argue that if schools and classrooms are more hospitable pupils might have a different view of schooling. They might also see teachers as guides and not as demanding bosses and will be more receptive of what is taught in class. Indeed educators need to think of ways to make school or classroom less intimidating especially to the Primary 1 and the Secondary 1 pupil, the former because they are entering school for the first time and the latter because they are stepping into a secondary school after being big brother/sister in a primary school, from a status of seniority they have become juniors in school again and most are awed by the presence of teenagers. Teachers might need to think of ways to make the classroom a “safe” place for pupils and when this occurs, pupils will be more prepared to take risks and to venture out and learn.

We believe that when we create a positive learning climate, the desire of the pupils to learn will also increase. There is a need to “hook” them into learning, a need to make the school so hospitable that they would rather stay in school than go to shopping malls. And, some schools in Singapore are making attempts to create that hospitable atmosphere. They have nice beach umbrellas, BBQ pits, vending machines of sorts, colourful tables and chairs, even big throw cushions or bean bag chairs in nooks and corners for pupils to laze around and read in comfort. At least one believes in “Wooling their students back from McDonalds (Lim & Low, 1996).

Creating a learning climate is not about furniture or other physical structures, it is mainly about people— how we relate

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to the pupils in our schools. One of the basic needs of man and women is the need to be noticed, a need for affirmation. No one is self-made. Each day we are influenced by the way people in particular, significant people in our lives relate to us. A nod or a smile is good enough for most. Everyone wants or needs to be noticed.

Man wishes to be confirmed in his being by man, and wishes to have a presence in the being of the other... secretly and bashfully he watches for a YES which allows him to be and which can come only from one human person to another. It is from one person to another that the heavenly bread of self-being is passed.
(Martin Buber, 1965)

But before teachers set about working on a positive learning climate, creating an inviting classroom, they must first be personally and professionally inviting with themselves. Teachers cannot create a positive learning climate if they do not believe in it. They cannot create an inviting classroom if they are not inviting, in short they cannot give what they do not have. They need to want to learn for if they are not interested in improving themselves constantly, why should they bother to create a positive learning climate. Learning is a form of caring for oneself, of finding oneself and to us teachers have a moral obligation to care for themselves.

Each day we are influenced by the way people in particular, significant people in our lives relate to us.

Many of our friends suffer from stress, some even need medication. To us, those who care for others must first care for themselves, therefore teachers should take good care of themselves. They should take that break during the holidays and get out of the country. They need to be refreshed before they get back to the classroom. We have seen teachers who work right through their June and December holidays and to us they are not doing justice to themselves and to their class. It is when you take a break, read materials which are not related to your work, do something other than marking or lesson preparation that you could be refreshed. When

professionals constantly sacrifice their own wants and needs to meet the demands of others, and if they are not appreciated, the sacrifice can gradually build resentment. And we have seen teachers who are resentful—who are very angry with their pupils when they do not do their corrections, or when they forget to bring their books, teachers who are resentful when their pupils talk or do not pay attention. Sometimes parents wonder why teachers are so upset over such “minor” issues, we understand why. They spend so much time marking, many mark till late at night, they sacrifice much for their class and when some in the class do not follow instructions, do not hand in or complete their corrections, they become very frustrated, angry and then resentful! Thus one of the first thing is that teachers must take care of themselves. Teachers need to learn to take that much needed holiday, they need to care for themselves physically, mentally, emotionally and spiritually. They cannot allow their pupils to drain them of their emotions. They need to sharpen their saw (Covey, 1989).

Then we should care about our work. Most teachers we know care a great deal about their work, they care about their pupils. They are concerned for their pupils. And this is a real positive thing, for to Barker (1993), without caring there can be no quality. To him once you care the concept of work changes fundamentally. Work no longer becomes a four-letter word and done grudgingly. Once we care enthusiasm and commitment will follow. And to Barker the spirit will return to the workplace.

Creating a positive learning climate is about people, their attitudes and then the environment. The school environment is where the pupils’ positive or negative attitude towards learning evolve. Everything in the environment counts. Pupils are bombarded with signals the minute they enter school, signals that tell them that they are valued, welcomed, cared for or not at all.

One of the easiest way to create that hospitable climate is to start with the physical setting. Schools should create a clean, comfortable and safe setting in which the pupils will feel welcome and at ease. From the classroom to corridors and to

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the toilets care must be taken to ensure that they are clean, comfortable and a signal is sent to the pupils that the school cares for them. I have seen schools with toilets that do not flush, toilet seats that are broken and dark, dingy sometimes smelly toilets. It has been said that people both create and are created by their environments.

Roles of school personnel

The Principal:

We need to start with the chief executive officer in the organisation—the principal. The principal has a very demanding job, the accountability and the responsibility that goes with the job can be really daunting. Principals need to stop and ask themselves one basic question and that is: **Of all the things I do, which help to create a positive learning climate and which hinder the creation of such a spirit?** Of all the things I do, which help or hinder my staff from giving their best or from enjoying their work? And if there were things I do which hindered them how can I cut down on them?

What can principals do that will help create a positive learning climate? We will list a few.

- Build up the teachers' emotional bank account (Covey, 1989).
- Help your teachers to see themselves positively. Positive teachers are able to reach out and like others. If teachers feel victimized, it will affect their work and their attitude to their pupils. The principal's job is often one of a cheerleader.
- Care for your staff (include non-teaching staff). Know your teachers' concerns interests, goals and try to consider them in your decision making.
- Trust your staff—the beautiful thing about trust is that when we trust, those who are trusted seldom let us down. Principals could then spend time monitoring those who abuse the system. It is important to remember that one should not set rules for everyone just to "catch" the recalcitrant ten percent! Performers should never be treated in the same manner as non-performers!

Schools should create a clean, comfortable and safe setting in which the pupils will feel welcome and at ease

- Be fair—nothing upsets more than to feel that you are unfairly treated.
- Support your teachers and give recognition when recognition is due. Giving praise does not cost the giver anything yet we will be amazed at how stingy we are with our praise.
- Boost up the teachers' morale. Principals could help staff to relate to each other and build up camaraderie. Principals could do more to help build up a sense of belonging. Studies both from abroad and the local scene have shown that one of the causes for poor morale among teachers is when they have relationship problems with their colleagues.
- Above all principals must constantly remember that they should not flog the willing horse, i.e., should there be teachers who are enthusiastic, keen and raring to go, then principals must take good care of them rather than pile work on their plate. For their sake and for the sake of the system such teachers should be nurtured and groomed for greater responsibilities later. We cannot afford to let them be burnt out.
- Meetings should be short and sweet and above all productive.
- Have welcoming, positive signs around the school premises, instead of all those "Trespassers will be prosecuted" and "Beware...." signs.
- Improve the teachers' lounge and take good care of the support personnel in school. They can contribute significantly to creating a positive or negative climate in school.

The Teacher:

If these are some of the do's and don'ts for principals, what then can teachers do to create a positive learning climate? Teachers need to remember that pupils are only temporary visitors to their class, they will move on at the end of the year. The pupils in their class are not their personal "property". They have been "shaped" by their parents and other teachers and they come in all shapes and sizes, each different from the other. That is what makes teaching so exciting. Can you

The beautiful thing about trust is that when we trust, those who are trusted seldom let us down.

imagine a class of clones?

A teacher's job is to teach and to nurture potential. Unfortunately some teachers do a lot of policing and this role is becoming more important in some schools. If pupils are terrified how can learning take place? More and more we believe teachers have to bring out the best in their pupils. They have to help them see that they do have lots to offer the class, lots to offer their peers. Teachers could learn to receive help from them too because unless there are people to receive they will not believe they have something to give. Education comes from the Latin word "educare" which means to draw out, so in a sense, teacher is not a pot filler but a pot "emptier".

Teachers need to enable pupils to see that they do have something to be "emptied". In other words affirm—help them to see that they do have hidden talents and help develop and nurture those talents. More and more of our pupils lack confidence in themselves and as teachers we may need to help build their self-confidence. Pupils who like themselves and also like their teacher will not want to misbehave. If our pupils are emotionally stable, have a good image of themselves, half our battle is won. We may need to take care of their emotional needs in particular, the need to belong.

Education comes from the Latin word "educare" which means to draw out, so in a sense, teacher is not a pot filler but a pot "emptier".

What can teachers do?

- Pupils should know where they stand with their teachers.
- Teachers should provide an atmosphere of success not failure.
- They could give students a sense of purpose, a vision of tomorrow.

One of the greatest functions of a teacher is to give his students a sense of greatness...the individual cannot or will not see and take advantage of opportunity, however physically available it may be, unless he is brought to believe that he has possibilities for growth and that this opportunity is a door for him (Pullias, 1975). Expect great things from them.

- Teachers should remember that pupils are our work, they are not interruptions.

Here are some handles:

- Pr 1, Pr 4 and Pr 6 teachers could have a meeting with parents, for many are anxious about their child's performance in these crucial grade levels.
- Be positive and know your pupils.
- Maintain a mail service, pupils can write to each other or to the teacher and the teacher can also write to pupils. One school has a mail service for their pupils and then they bring all the requests that their pupils make to the church and leave it there.
- Teachers should assign "can do" homework.
- Report to parents when their children do well. Often times parents are "summoned" to schools when their children get into trouble what about calling them up to report good work?
- Teach our pupils respect by respecting them.

Conclusion

When we have a positive learning climate in school everyone benefits. School is about learning, it is not about detention or homework. It is our dream to see people going into school gates leaping and springing with joy because they are coming to learn together with others of like mind. The school should build not only the pupils but everyone who is there including the non-teaching personnel! Teachers should take upon themselves the responsibility to upgrade and update, to develop themselves professionally and personally.

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SEVEN STRATEGIES THAT ENCOURAGE NEURAL BRANCHING

Thomas Cardellichio and Wendy Field

Teaching strategies that overcome the brain's natural tendency to limit information can open students' minds to new ideas and creative mental habits.

Imagine trying to hit a baseball and noticing all the colours of the stadium, the advertisements, and the roar of the crowd. The overwhelming amount of stimuli might make it impossible for you to hit the ball.

When we are born, our brains have the potential to assimilate a large variety of stimuli. Over time, we develop mental routines and patterns in response to the stimuli that are critical to our lives. Scientists call the process by which we develop selective mental patterns "neural pruning." It is a natural brain function since we could not possibly survive if we had to learn to interpret stimuli anew each time we experience them. We would be overwhelmed with input to the point of being unable to function.



“Extending the neural network” or “neural branching” ... strengthens the brain - creating more synapses between nerve cells - just as exercise builds muscle tissue.

Recognising this, it is nevertheless advantageous to be able to attend, selectively, to many stimuli - to overcome our neural pruning. In biological terms, we might call this “extending the neural network” or, in more poetic terms, “neural branching” - the opposite of neural pruning. Current research indicates that this type of significant “brainwork” strengthens the brain - creating more synapses between nerve cells - just as exercise builds muscle tissue.

The Effects of Neural Pruning

A personal example illustrates how neural pruning closes down our ability to perceive information. This summer, we participated in a workshop on visual thinking at the Metropolitan Museum of art in New York City. In the first exercise, we observed a slide that was completely out of focus. What was visible was a blur with barely distinguishable smudges of colour. We were asked to draw what we saw. In the next phase, the focus was adjusted slightly so that the blurs became unformed patterns of colour. In the third phase, the focus was sharpened a little more so that the shapes became more obvious. Finally the slide was brought completely into focus to reveal Ruben’s *Venue and Adonis*.

In the discussion that followed, the instructor asked us to comment on what we had observed. One of us, at phase two, thought he saw an angel and the Madonna. At phase three, he was sure he had this “problem” “figured out”. He knew it was a portrait of a 16th-century courtier. He was sure he could “see” a ruffled collar around the courtier’s neck.

During the discussion, the instructor made this point: “If you look for information, you won’t see what is there.” We were so conditioned to discover the content of the picture that we failed to notice or appreciate the aspects of colour, line, patterns and other elements that were present in the object itself. We were imposing our meaning on the data, and in the process, we were creating something altogether wrong. The process we

used was wrong, and the results obtained were wrong. When looking at a picture, our neurons had been predisposed to function according to a certain established routine.

The Implications of Neural Branching

Working to extend our neural networks has important implications for education. Good teaching requires that students have the opportunity to select and assimilate enough data to force them to challenge misconceptions and to create strong, accurate conceptions. They cannot do this if the curriculum or the methodology or the structure of the school is so rigid that students experience only the presentation of data without the opportunity to make sense of it. That kind of teaching only accelerates neural pruning where we want to encourage neural branching.

The first step in encouraging neural branching is to develop a structure or framework that will support the kind of inquiry we need to do both in the classrooms in the organisation. We need to create a mechanism that will accomplish the same effect as blurring the focus on the slide projector so that we can look at familiar things with new eyes - the things that might not be obvious at first glance given our predispositions. In effect, we are trying to create the opportunity to look at something for the first time - before our mind-set becomes rigid.

The following seven strategies, or types of thinking, are particularly suited to extending the neural network. We have incorporated these strategies into our supervision and coaching of teachers and in our classroom teaching. Underlying all seven is the assumption that questioning is a far more powerful way to encourage neural branching than is explication or narration. The seven strategies can shape a generalised structure for inquiry that should undergird the framework needed to apply these strategies in various arenas - particularly in the design of curriculum. Such a structure

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Hypothetical thinking is a powerful stimulant to neural growth because it forces us to conceive of issues and consequences other than the standard and expected ones.

would consist of a series of questions that we could apply to new data or to our old paradigms.

The examples that follow show how we have used these strategies to effectively extend students' thinking in all areas of the curriculum.

Seven Strategies

1 *Hypothetical thinking.* Hypothetical thinking is a powerful technique for creating new information. It is said that Einstein developed his theory of relativity by asking, "What would it look like to ride on a beam of light?" Hypothetical thinking is a powerful stimulant to neural growth because it forces us to conceive of issues and consequences other than the standard and expected ones.

Here are examples of hypothetical questions one might use in a social studies class:

What would have happened if Columbus had landed on the west Coast of North America?

What if the colonies had lost the Revolutionary War?

What if Washington, D.C., were situated in Kansas?

The key to the use of hypothetical questions is not in asking the question itself but in the follow-up questions that clarify both the complexity of forces that create events and the inter-related web of circumstances that follow from them.

Hypothetical questions take the following general forms:

What if this had happened?

What if this were true?

What if this had not occurred?

What if I could do something I can not do?

2 *Reversal* One of the techniques used in visual thinking to get outside the context or beyond the information is to blur the picture or turn it upside down. What is a verbal

equivalent of turning the picture upside down? One possibility is to go backward from results to causes. We could ask, "What could have happened to create this situation?"

Reversal is a specific kind of hypothetical thinking that highlights attributes of events or situations that might otherwise go unnoticed.

Here are a few examples of questions that use the reversal strategy:

What happens if I reverse the addends in a maths problem? Can I do this in a subtraction problem?

What if Nixon had been elected president before Kennedy?

What if your mother had your father's job and your father had your mother's job?

What if Japan had won World war II? In some cases, asking students to generate other questions may be even more profitable than looking for answers.

General questions that solicit this kind of thinking are the following:

What caused this?

How does this change if I go backward?

What if I turn this upside down or sideways?

What if _____ had happened first?

3 *Application of different symbol systems* Sometimes we get locked into rigid ways of thinking by applying the rules and procedures of particular thinking systems. Another way to extend the neural network is to apply a symbol system to phenomena for which it is not usually used. For example, we use language (the verbal symbol system) for interpersonal communication. What happens if we apply the verbal symbol system to a problem for which we ordinarily use the numerical symbol system? We could, for example, ask students to explain the Pythagorean theorem in words after we teach its mathematical representation. Continuing, we could ask students to draw a picture (visual symbols) of the Pythagorean

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theorem that shows us they understand it.

We can also move from verbal systems to quantitative systems. Students could graph or chart relationships in a social situation or in a literary work. Perhaps they could write an equation to show how human interactions are related.

General questions that prompt this kind of transference include the following:

- Can I make this into a word problem?
- Can I make this into a number problem?
- Can I draw a picture of this?
- Can I represent this in musical terms?
- Can I make a dance to represent this?

4 *Analogy* Another process of mental extension is to look for correspondences: What is like this? Looking for forced correspondences requires a greater "stretch" - more creativity.

For example, how is the Pythagorean theorem like a cooking recipe? Looking for correspondences will create new insights about both elements of the analogy.

The general question that stimulates analogical thinking is "How is this like _____?"

5 *Analysis of Point of View* This viewpoint is the act of determining why someone holds a particular opinion or belief. It can be taught in a very behavioural and rigorous fashion by forcing students to question for details and evidence. Considering specifically the reasons why a person may hold a particular belief or opinion is a way of extending our own mind-sets.

The general forms of questions that provoke analysis of point of view are:

- What else could account for this?
- Who would benefit if I thought this?

What harm might occur if _____?
How many other ways might someone look at this?
What would _____ (for example, my mother) say
about this?

6 *Completion* When something is incomplete, there is a natural urge to complete it. If you show students a picture with a hole in it, they will immediately ask what was taken out before they attend to other aspects of the picture. This urge can be used to extend students' thinking in multiple ways. Here are a few examples:

- Remove the conclusion from a short story and ask the students to create their own ending.
- Tell the students that chapter one is about the Revolutionary War and chapter three is about the Civil War.
Ask what they expect to find in chapter two.
- Give the students the steps in a process or a solution (to a maths problem, for example) with one or two steps missing. Ask what they think is missing.

This exercise involves greater or lesser degrees of ambiguity, depending on the context set. Two aspects of the exercise are important. First, questions should guide students toward reasonable answers - answers with evidence - so that they are forced to think of reasons for their responses. Second, encouraging a variety of answers will help students see that things can be connected in multiple ways, so that they do not become rigid in their approaches.

General forms of questions that provoke this kind of thinking include:

- What goes in the blank space?
- What is the missing piece or step?
- How would you end the story?
- Write the beginning of _____.
- What if _____ did not happen?

**Looking for
forced
correspondences
requires a
greater
"stretch" -
more
creativity**

encouraging a variety of answers will help students see that things can be connected in multiple ways, so that they do not become rigid in their approaches

7 Web Analysis One of our premises is that events and phenomena are related in complex ways. To make sense of things, our brains tend to over-simplify these relationships. The exploration of the complexity of relationships provides exercise that encourages neural branching. To experience this, answer the following questions with a partner, and during the process, reflect on how the experience feels to you:

How many people's lives do you think were affected by the deaths of Nicole Brown Simpson and Ronald Goldman? How were they affected?

What would happen if people stopped drinking Coca-Cola?

How was subsequent history affected by the death of John F Kennedy?

What happened when the first settlers in Puget Sound clear-cut all the timber?

8 Hypothetical Thinking

At least two significant differences distinguish web analysis from hypothetical thinking. First, web analysis is concerned with what actually happened, not with possibilities. Second, hypothetical thinking may focus on one or two results; in web analysis the goal is to uncover the complex multitude of effects that may flow from a single source.

The power of web analysis to stimulate neural branching lies in moving beyond the obvious answers to uncover connections that we may not have realised previously. After we begin to "trace the web", the operative question becomes, "And what else?"

The following questions are the type that stimulate web analysis:

How extensive were the effects of _____ ?

How many effects can you imagine from _____ ?

Track the relationship of events following from _____ ?

How is _____ connected to _____ ?

9 Web Analysis and Hypothetical Thinking

The Ultimate Goal

All these strategies are related to one another in that they provoke divergent thinking. Using the strategies can extend students' neural networks and deepen their understanding - not just of the issue in question but also of the way our minds create meaning, of our biases. The more adept we become at understanding the tool that is our mind, the more power we gain over our own mental processes. It's like gaining the ability to see things as new, like the child who is full of wonder and questions, in order to force the brain into more assimilation and more accommodation.

The intent is not to diminish the importance of basic skills, content or convergent thinking. These are essential for the growth of understanding. But there is a paradox in creating meaning. We need a framework to organise new information, to guide our search for new knowledge, to help us decide what should be selected for attention. We need a methodology to allow us to explore and to help us make sense of the results of those explorations. We need theory for its power to generalise and extend our knowledge. At the same time, we need to avoid becoming victims of our own knowledge, theories and beliefs. That is, we need a way to look beyond the information we have, beyond our theories, and beyond our beliefs.

This is important work. What we are attempting to do is to protect students and ourselves from the curse of the closed mind. It is fundamental to our business as educators.

It is also important because we are not just talking about new ways of looking at the world. We are talking about plans for changing the structure of brains - educating brains that are fundamentally more powerful because they are able to assimilate a greater range of data and educating brains that are structured differently because they accommodate more diverse data. The goal is to create explorers who have an

The exploration of the complexity of relationships provides exercise that encourages neural branching

The more adept we become at understanding the tool that is our mind, the more power we gain over our own mental processes.

idea of what they are looking for, who have a methodology with which to search, but who come to the exploration with open minds so that, should they discover America, they will not assume they have landed in India just because that's where they intended to go.

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EATING DISORDERS: WHAT TEACHERS NEED TO KNOW

Vilma D'Rozario

Earlier this year, a twenty-one year old undergraduate woman died of an eating disorder. *The Straits Times* (20 Mar 96) reported that at her death, she weighed only thirty-two kilogrammes, and that she had shed nearly forty kilogrammes in the last five years. When interviewed, a family member stated that the woman began losing weight while in secondary school. Her weight loss was a result of her dieting, skipping meals and exercising. Her family also observed that she had suffered severe diarrhoea and loss of hair. Worried about her drastic weight loss, they had urged her to seek medical help. Her brother reported that the woman saw a psychiatrist as well as a physician, but that the family did not know exactly what she was suffering from.

According to medical statistics, eating disorders are less uncommon in Singapore today. This was disclosed in a television report entitled, "Anorexia nervosa: Dying to be thin" (*Talking Point*, 15 Jun 94). The report adds that although the numbers of young people with clinical eating disorders is small, the numbers have risen sharply in recent years. In addition, it is possible that more individuals may be suffering sub-clinical symptoms of disturbed eating and dieting patterns, though they may not have the clinical disorder.



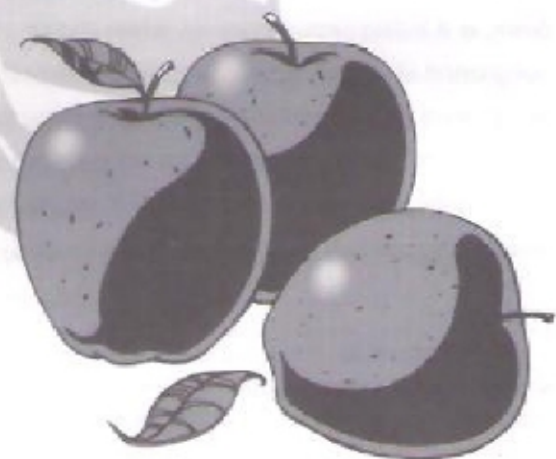
As the onset of eating disorders occurs mainly during adolescence, it is important for teachers to be able to recognise students at risk of, or with the disorder, and be familiar with the steps they can take to help. This paper will provide a guideline for identifying the symptoms of two types of eating disorder: anorexia nervosa and bulimia nervosa, as well as outline the measures teachers can take to help.

WHAT ARE THE RISK FACTORS?

In the United States, a substantial amount of research on eating disorders has focused on possible risk factors associated with this illness. For example, it has been established that the eating disorders have a general onset of between fourteen to eighteen years of age and occur more frequently in females than males (Wright, 1996). In many societies, including our own, it is ideal for women to be slim, as slimness is equated with attractiveness. This preference for slimness places great pressure on teenage girls and young women to strive towards being thin, thus putting them at risk of developing an eating disorder. Research studies have also reported that women with eating disorders tend to come from middle to upper-middle class homes (Anderson and Hay, 1985). Further, it has been found that families where a member has an eating disorder tend to be characterised by chaos and conflict in the case of bulimics (Schwartz, Barrett, and Saba, 1985; Boumann and Yates, 1993), and overcontrol and rigidity in the case of the anorexic (Sargent, Liebman, and Silver, 1985). It has also been established that individuals with low self-esteem tend to be more prone to developing an eating disorder (Wright, 1996).

HOW DO WE RECOGNISE ANOREXIA NERVOSA?

The diagnostic criteria for anorexia nervosa presented by the recently revised *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV, 1994) published by the American Psychiatric Association include the following critical elements:



- refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight less than 85% of that expected; or failure to make expected weight gain during periods of growth, leading to body weight less than 85% of that expected);
- intense fear of gaining weight or becoming fat, even though underweight;
- disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight; and
- in postmenarcheal females, amenorrhea, i.e., the absence of at least three consecutive menstrual cycles;

Further, the DSM-IV specifies two types of anorexia:

- the *restricting type*, where during the current episode of anorexia nervosa, the person has not engaged in binge-eating or purging behaviour (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas);
- the *binge-eating/purging type*, where during the current episode of anorexia nervosa, the person has regularly engaged in binge-eating or purging behaviour (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

An anorexic student may be identified by her¹ relentless pursuit of thinness. Her determination to restrict herself to a limited and low fat/ low calorie diet, and use compensatory behaviours, like compulsive exercising to keep her weight down, is a telling sign. However, when shown concern or questioned about her drastic weight loss, expect that she would react defensively. She will tend to deny that she is underweight. Often, students with anorexia have a distorted view of their body shape and size, and see themselves as heavy although they may, in fact, be emaciated. Her denial



¹ The female gender is used here and elsewhere in the paper, because it is an established fact that more women develop eating disorders than men. However, the author would like to add that her exclusive reference to the female gender in this paper does not exclude the fact that men, too, can develop the disorder.

may cause relationships close to her to be strained. She may begin to isolate herself, keeping away from social situations, with the motive of keeping secret her abnormal eating habits. Loose clothing may be used as a camouflage for her gross loss of weight. Often, she will tend to have low self-esteem. She may experience mood swings and feel depressed and anxious. Wright (1996) concludes that an anorexic prides herself on controlling her weight. Her sense of self-worth is thus closely linked with her control over food. To her, the ability to successfully lose weight becomes a sign of her achievement and self-control. It is her attempt to mask her true feelings of ineffectiveness and inadequacy (Wright, 1996). Some theorists hypothesize that an anorexic's behaviour is a means by which the individual is striving to gain control and independence from an overly critical and controlling parent (Wright, 1996).



HOW DO WE RECOGNISE BULIMIA NERVOSA?

According to the DSM-IV (1994), the critical elements for bulimia nervosa include:

- recurrent episodes of binge eating. An episode of binge eating is characterised by both of the following:
 - eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances);
 - a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control how much one is eating);
- recurrent inappropriate compensatory behaviour in order to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise;
- the binge eating and inappropriate compensatory behaviour both occur, on average, at least twice a week for 3 months; and
- self-evaluation is unduly influenced by body shape and weight.

The DSM-IV also distinguishes two types of bulimia nervosa:

- *purging type*, where during the current episode of bulimia nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas;
- *nonpurging type*, where during the current episode of bulimia nervosa, the person has used other inappropriate compensatory behaviours, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

A bulimic student will engage in a tragic cycle of bingeing and purging behaviour. Wright (1996) states that bingeing may be a response to a need to nurture oneself, or indulge oneself after restricted food intake—the binge tends to help soothe and reduce anxiety, and this, unfortunately, leads to repeated binges. The fear of gaining weight is often the cause for the accompanying purging behaviour. Wright (1996) states that binges are normally planned, and therefore, the bulimic student will tend to avoid social activities with family and friends, because she has, instead, to schedule her private binge and purge activities. Wright (1996) concludes that her binge and purge cycle becomes her way of handling painful emotions.

The bulimic student will tend to feel a loss of control over food, and extend this feeling to embrace a loss of control over life in general. Her body image will tend to be distorted and she will be extremely conscious of her weight. Unlike the anorexic, the bulimic student's weight will tend to remain stable, though it may fluctuate a little above or below her usual weight. However, she will begin to look unwell, and may exhibit a swollen face and neck due to the repeated stimulation of the gag reflex. The back of her palms may appear bruised because of their constant abrasion with her teeth while she is forcing herself to throw up. Similarly, her teeth may appear chipped and moth-eaten. Psychologically, a student with bulimia may be prone to depression, low self-esteem, anxiety, feelings of worthlessness and suicidal thoughts. The bulimic student also tends to be ashamed of her bulimic behaviour.

Psychologically, a student with bulimia may be prone to depression, low self-esteem, anxiety, feelings of worthlessness and suicidal thoughts. The bulimic student also tends to be ashamed of her bulimic behaviour

Successful treatment for students with an eating disorder requires the collaboration of multidisciplinary team members

TREATMENT

It is imperative for teachers to realise that eating disorders are complex psycho-physiological disorders and can be life-threatening if treatment does not come in time.

Treatment is often long-term and relapses are common. It has become apparent in research studies in the United States that no one professional group can handle all aspects of a given eating disorder patient's needs—a multidisciplinary approach is needed (Stephenson et al., 1988).

Successful treatment for students with an eating disorder requires the collaboration of multidisciplinary team members. Multidisciplinary teams for eating disorder treatment usually consist of medical doctors, psychiatrists, clinical or counselling psychologists, skilled nursing staff, social workers, dieticians, and school personnel. Only with a team approach can the student begin to establish acceptable healthy body weight, medical and nutritional status, as well as decrease and eventually eliminate all unhealthy eating and dieting patterns—especially purging activities (Stephenson et al., 1988). Other goals sought by the multidisciplinary team approach would include achieving at least enough psychological change within the student and family to allow for symptom remission without someone else in the family developing problems, and enabling the family to reach a better level of functioning, so that it can better withstand external and developmental stressors, and to work with family members towards greater emotional closeness with the student without sacrificing the student's identity (Stephenson, 1988).

TEACHER AS REFERRAL PERSON

It is necessary for teachers to play a key role in the multidisciplinary team approach to the treatment of eating disorders. When teachers observe symptoms of an eating disorder, their appropriate role would be that of referral agent.

Here are some guidelines to consider:

- speak privately to the student concerned and openly share your concern for her behaviour;
- encourage her to see a medical doctor as well as to seek either psychiatric or psychological help;
- with the student's consent, involve the student's parents, the principal, and perhaps the school counsellor (if there is one) or the pastoral care coordinator;
- assist the student in making the initial contact with a doctor and psychiatrist or psychologist; and
- continue to maintain daily contact with and support the student while she is in school—this is crucial in demonstrating your continuing concern for her.

WHERE CAN PROFESSIONAL HELP BE FOUND?

Listed below are some resources teachers may obtain information from, as well as refer students to:

Referral agency	Who it is for	When to call	Number to call
Child Psychiatric Clinic	Young people (0-18 years) who have emotional and behavioural problems. Assessment, diagnosis, and treatment conducted by a multidisciplinary team of psychiatrists, psychologists, social workers, teachers and nurses.	Mon - Fri 8.30 am - 4.30 pm Sat 8.30 am - 12.30 pm	322-2538
Counselling and Care Centre	Individuals, couples and families experiencing psychological, marital and family problems	Mon - Fri 8.30 am - 5.00 pm	337-7748
Total Wellness and Counselling Centre	Individuals, couples and families experiencing psychological, marital and family problems	Mon - Fri 8.30 am - 5.00 pm	466-7777

The following are telephone hotlines that students can use to call in for information and help. Teachers may also use these helplines for information and enquiries about referral.

Helpline	Who it is for	When to call	Number to call
Eating Disorders Helpline	Individuals with disturbed eating and dieting patterns	Mon - Fri 9.00 - 5.00 pm Weekends: Phonemail	345-3435
Studentline	Students from primary to pre-U level with problems	Mon - Fri 9.00 am - 12.00 noon 2.00 pm - 4.30 pm	1-800-281-2522

Affirm students for their internal qualities and encourage them to do the same for their peers

PROACTIVE MEASURES

Teachers need to be proactive in establishing an environment of trust within their classrooms in order for students with problems to approach them. Safe and non-threatening classroom environments promote students' personal and social development, and encourage peer relationships. Healthy classroom environments provide support and encouragement to students who may be facing psychological problems.

To be helpful to students who may be at-risk of developing an eating disorder, teachers need to encourage the development of positive self-image, by picking out the good in their students, teaching them to see the good in themselves and in their peers; and avoid feedback which centres only on the external qualities of physical appearance and academic achievement. Instead, look for internal positive qualities like courage, honesty, perseverance, and cheerfulness. Affirm students for their internal qualities and encourage them to do the same for their peers.

CONCLUSION

The teacher's role in a multidisciplinary team approach requires the development of specific helping skills. To be effective, teachers need to ensure that they are familiar with:

- the risk factors associated with eating disorders, for example, that these disorders tend to occur during adolescence, to mainly female students, students who have dysfunctional families and who tend to have low self-esteem;
- the symptoms of anorexia and bulimia as specified in the guidelines provided;
- appropriate referral agencies and procedures for referral of students with disturbed eating and dieting patterns; and
- skills of working with families

At the school level, education and prevention programmes can be drawn up within the school curriculum, especially for at-risk groups. These programmes could come under the auspices of pastoral care.

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Training Needs in Assessment Revisited

Soh Kay Cheng and Poh Sui Hoi

In recent years, three American professional organizations [Association of Supervisors and Curriculum Development (ASCD); American Association of School Administrators (AASA); National Association of Elementary School Principal (NAESP)] came up with several important competencies in assessment deemed necessary for educational leaders (Matthews, 1991). Impara, Plake & Fager (1993) found school administrators typically have more training in testing and measurement and are more knowledgeable than teachers on assessment topics.

Subsequently, Impara, Plake & Merwin (1994) identified specific student assessment tasks performed by school administrators and the knowledge, skills, and abilities needed to perform these tasks. The 24 specific assessment tasks identified by them included such activities as using test scores to select students to special educational programmes, evaluate student performance, placing/grouping students in class, evaluate teachers/administrators, conference with parents/others about student assessment, evaluate instructional materials & methods, and even training of teachers to develop/use tests and helping teachers develop alternative assessments. It is obvious that these are demanding, if not formidable tasks, in view of the other responsibilities that school administrators have to fulfill. Further, Impara & Plake (1996) have identified 13 areas; like assessment knowledge, skills, and abilities needed by the administrators to effectively perform the many and varied assessment tasks.

Notwithstanding the active role in assessment played by administrators in American schools as suggested by the above studies, the organic relation between assessment and instruction at the classroom level cannot be overemphasised. This is aptly explicated by Stiggins (1992) thus,

The quality of instruction is a function of teacher's understanding of the strengths and weaknesses of their students. The depth of that understanding, in turn, depends on the quality of teachers' assessment of student achievement. Thus, *sound instruction requires sound classroom-level assessment of student achievement.* (p.35, emphasis added)

In the Singapore context, where examinations play a decisively crucial role, assessment is more a professional responsibility of the classroom teachers rather than administrative responsibility of the school principals. Here, the heads of departments, however, perform an important intermediary function between the school administration and the classrooms. In a sense, much of the assessment responsibilities typically performed by the American school administrators, shown in the studies cited above, would be delegated to the heads of department in Singapore schools.

The need for knowledge, skills, and abilities to effectively perform assessment tasks has thus given rise to the need for training courses designed to equip teachers and heads of department for this part of their respective professional responsibilities. Over the years, in-service courses on assessment have been mounted for teachers who have not been sufficiently trained in assessment in their initial teacher education programmes. As for new pre-service teachers, a 20-hour module in assessment basics is made a compulsory component of their training programme. Moreover, to ensure leadership in assessment be available in the schools, the Further Professional Diploma in Education Programme which prepares experienced and capable teachers to assume the role of heads of department include a 30-hour module of Classroom-Based Assessment and Evaluation.

The Classroom-Based Assessment and Evaluation module consolidates the participants' competence in the essentials of assessment such as test planning, item/question writing, item-analysis, scaling and reporting. These are quite routine in nature in the school context. Beyond these, participants are made aware of assessment issues of local and foreign origin and of the assessment profession in general. They are introduced to selected journal articles dealing with the issues and form groups to study in-depth with the view to share the outcomes with the class. This provides an opportunity for the participants to be aware of the current issues and relate these to their professional practice.

Moreover, the participants are guided to complete projects on selected aspects of assessment relevant to their individual needs and interests. Some participants feel the need to start developing an item-pool for their respective subjects and apply their training in the use of computer software for this purpose. Some others carry out examination analysis to investigate problems arising from exam results that have been bothering to the schools. Yet, some others are more conceptually oriented and conduct studies in comparisons of marking methods, of essay-questions and objective tests on the same subject matter, and of the use of raw marks and scaled scores.

As indicated above, such efforts to enhance the assessment capabilities in the schools have been made over the years. One relevant question to ask is whether the ways schools use assessment information and the training needs have changed and, if so, in which aspects. To

answer this question, a survey of 54 secondary school teachers participating in the heads of department training programme in 1997 was conducted. The questionnaire was the one used in a previous study (Soh & Poh, 1992) which also provides information for comparisons to be made. The questionnaire was designed with reference to professional training needs in assessment as identified by Schafer (1991), Stiggins (1992), and Holen, Haladyna & Haas (1992). A new question on the current assessment practices in schools was added for an insight into the congruence between the theoretical aspect (ie what the assessment profession would recommend) and the reality of the school (ie what actually happens).

Respondents

As shown in Table 1, the 54 respondents cover the whole spectrum of subject specialization in the school curriculum, with some one-quarter each in Language/Literature and Science, about one fifth each in Mathematics and Social Studies. Other areas covered include Design & Technology, Media Resources, and Physical Education. As they are prospective heads of department in secondary schools, almost all are degree holders. There is a 1:3 ratio between males and females, and on the average they have about 13 years of teaching experience.

Table 1. The Respondents

	1997 (N=54) %
Specialisations	
Language/Literature	23.6
Science	23.6
Mathematics	18.2
Social Studies	16.4
Design & Technology	7.3
Media Resources	7.3
Physical Education	3.6
Qualification	
Degree	96.5
Non-degree	3.5
Gender	
Male	27.5
Female	72.5
Years of service	
	Mean 12.7
	SD 5.2

Administrator Uses

The three most frequent uses by school administrators of assessment information are for the identification of curricular strengths and weaknesses, evaluation of school effectiveness, and evaluation of teacher effectiveness (Table 2). This does not seem to have changed over the past 5 years between the two studies. However, the 1997 group reported greater frequency for using assessment to evaluate teacher effectiveness and lower frequency for advertising the school. These shifts of emphasis might have come about as a consequence of the school ranking scheme, introduced in late 1992, by which secondary schools were ranked and classified based on the Singapore-Cambridge General Certificate Examination Ordinary (GCE 'O') Level examination results. The effects of school ranking is yet to be formally evaluated, but the shifts observed in this study could be an indication of the motivating effect that the scheme is meant to have exerted on the schools.

Table 2. Administrator Uses of Assessment Information

		1992 (N=81)		1997 (N=54)	
		%	Rank	%	Rank
1	Identify curricular strengths/weaknesses	79.0	1	71.9	2
2	Evaluate school effectiveness	72.8	2	66.7	3
3	Evaluate teacher effectiveness	52.5	3	73.7*	1
4	Advertise the school	52.5	3	21.1*	6
5	Evaluate teaching methods	50.6	5	49.1	4
6	Identify teacher strength/weaknesses	43.8	6	50.0	5
7	Evaluate materials (eg textbooks)	22.5	7	19.3	7

* Chi-square test show significant group difference ($p < 0.05$).

Teacher Uses

For the 1997 group, the three most frequent uses of assessment information are for identification of remedial students, guiding instruction, and diagnosis of learning problems (Table 3). There is now a greater emphasis on using assessment information to evaluate teaching methods. However, less emphasis are given to using assessment for placement of students for instruction, prediction of student performance, measuring class effectiveness, stimulating curriculum revision, and identification of gifted students. These suggest that the teachers' role has become more focussed on teaching while other professional functions might have been taken care of at the administrative level or by other agents in the case of curriculum review and identification of gifted students or selection to other programmes.

Table 3. Teacher Uses of Assessment Information

	1992 (N=81)		1997 (N=54)	
	%	Rank	%	Rank
1 Identify remedial student	97.5	1	94.7	1
2 Guide instruction	82.7	2	82.5	3
3 Place students for instruction	79.0	3	45.6*	8
4 Diagnose learning problems	75.3	4	87.7	2
5 Communicate with parents	75.3	4	75.4	4
6 Predict student performance	74.1	6	56.1*	6
7 Measure class effectiveness	70.0	7	52.8*	7
8 Evaluate teaching methods	54.3	8	71.9*	5
9 Stimulate curricular review	51.9	9	26.1*	9
10 Identify students for special services	34.6	10	24.6	10
11 Identify gifted students	31.6	11	3.5*	11

* Chi-square test show significant group difference ($p < 0.05$).

Teachers' Training Needs

The three aspects of assessment for which training are indicated most frequently by the 1997 group are planning assessment, interpretation of assessment results, and evaluation of test quality (Table 4). This is consistent with the previous group's response.

Table 4. Teachers' Training Needs in Assessment

	1992 (N=81)		1997 (N=54)	
	%	Rank	%	Rank
1 Planning assessment	53.1	1	63.2	3
2 Interpreting assessment results	34.6	2	71.7*	2
3 Evaluating test quality	33.3	3	77.2*	1
4 Developing essay-type questions	32.1	4	26.3	12
5 Developing objective tests	29.8	6	42.1	7
6 Uses and limitations of assessment	27.2	6	29.8	10
7 Concepts and terminology of assessment	23.5	7	28.1	11
8 Communicating assessment results	23.5	8	49.1*	5
9 Grading essay-type answers	19.8	9	33.3	9
10 Using item-analysis techniques	17.3	10	63.2*	3
11 Understanding effects of testing	17.3	11	49.1*	5
12 Developing rating scales	6.2	12	40.4*	8

* Chi-square test show significant group difference ($p < 0.05$).

By comparison, the 1997 group indicated greater training needs in the areas of interpretation of assessment results, evaluation of test quality, communication of test results, use of item analysis techniques, understanding the effects of testing, and development of rating scales. Overall, greater training needs of teachers have been indicated by the prospective heads of department. This also reflects their awareness of the ramifications of assessment and the need for other important aspects of assessment beyond setting good test items and question.

Roles of NIE Staff

The three most frequently assigned roles National Institute of Education (NIE) staff can play in helping the schools in enhancing assessment capability are to conduct school-based workshops, joint effort with heads of department in school-based workshops, and serving as resource persons for consultation (Table 5). Compared with the previous group, there is an overall increase in the need for NIE staff to play a more active role in this regards, as indicated in the increases in percentages for many of the roles such as conducting school-based workshops and serving as resource persons. It is encouraging that the group were more aware of the role NIE staff could play in research in assessment both at the school level and in the academic context.

Table 5. Roles of NIE Staff

	1992 (N=81)		1997 (N=54)	
	%	Rank	%	Rank
1 Conduct school-based workshops	65.8	1	96.5*	1
2 Joint effort with HOD in school-based workshops	48.1	2	56.1	3
3 Conduct campus-based in-service courses	32.9	3	36.8	6
4 Serve as resource persons for consultation	21.5	4	66.7*	2
5 Assist in school-based research on assessment	17.7	5	43.9*	4
6 Research on assessment and share findings with schools	13.9	6	38.5*	5

* Chi-square test show significant group difference ($p < 0.05$).

Assessment Practices

The three most frequently mentioned assessment practices in the schools are, according to the 1997 group, submission of draft tests to heads of department for vetting, discussion with heads of department on the items/questions drafted, and amendments of items/questions after vetting by the heads of department (Table 6). Obviously, these practices are necessary to ensure quality of tests used for assessment purposes. It is also worth noting that no less than two-thirds of the respondents mentioned the practice of drawing up tables of specifications and analysis of examination results. However, the use of item-analysis to identify items for future use (ie building a school-based item pool) and year-to-year comparability of standards do not seem to have received attention they warrants.

Table 6. Assessment Practices

	1997 (N=54)	
	%	Rank
1 Draw up Table of Specifications for the test	71.9	4
2 Discuss with HOD on the Table of Specifications	52.6	6
3 Use checklists to evaluate the drafted items/questions	31.5	8
4 Submit the draft tests for vetting by HOD	87.7	2
5 Amend items/questions after vetting	96.5	1
6 Discuss with HOD on the Items/questions	75.4	3
7 Conduct item-analysis to evaluate the items/questions	1.9	12
8 Select good items/questions for future use	3.5	11
9 Analyze assessment results for remedial teaching	66.7	5
10 Analyze assessment results for curriculum improvement	38.9	7
11 Compare results for various sections of a test	22.8	9
12 Study consistency among tests over a period of time	5.3	10

Conclusion

It is a truism that in our system, assessment has immediate effects on the teachers and school administrators who assess, and long-term effects on the students assessed. Hence it is important to constantly improve the knowledge, skills, and abilities of teachers, heads of departments in assessment and assessment-related matters. While there are signs indirectly indicating the effects of school ranking on assessment in the schools, there are also positive indications suggesting that the teachers are becoming more 'professional' where assessment is concerned. These also suggests that, in years to come, more assessment training is indicated and NIE staff will have to play a more active role in enhancing the assessment capability of the school personnel — teachers, heads of departments, vice-principals and principals all included.

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ANNOUNCEMENTS

The article "Handling Bullying in Schools" which appeared in Vol 7 No 1 of the ASCD (Singapore) REVIEW is a review by the Editorial Board of the article "Bullying in Schools" submitted by Dr Tan Ai Gih, lecturer at the National Institute of Education, Nanyang Technological University. The first paragraph on page 46 and "intervention and prevention" were suggested by the Editorial Board. Years of publication of papers cited were removed for ease of reading.

The theme for the next issue of the REVIEW (Vol 7 No 3) is **EVERY CHILD CAN LEARN**. Articles are invited from schools of school-based projects which have led to learning by all pupils. Manuscripts should be between 2000 - 2500 words, typed-written. Photographs would be appreciated. Send 2 copies of the manuscript together with a soft copy to

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Deadline for articles is **1 Oct 97**.

The themes for the two following issues of the **REVIEW** are:

Vol 8 No 1 : **Schools and Technology**
Deadline for articles : 1 Dec 97

Vol 8 No 2 : **Schools as Learning Organisations**
Deadline for articles : 1 Feb 98

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