This book makes a welcome addition to the burgeoning interest in the Habits of Mind throughout the world and will be useful to teachers, parents, community leaders and business executives as they infuse the Habits of Mind into their schools, homes, factories and office in an effort to make them even thought-ful places.

Prof. Arthur L. Costa

Henry Toi's Habits of S.U.C.C.E.S.S. is a practical, hands-on, teacher-friendly book that I could not imagine being without. It describes the qualities that characterize successful thinkers and provides many inspiring and innovative suggestions for teachers to apply in their classrooms in order to improve the thinking habits of their students. Henry Toi's unique creativity is exemplified in his Habits of S.U.C.C.E.S.S. with an arresting array of Mind Maps and humourous stories that bring his text to life for all readers and prospective learners.

Dr. Gabrielle C. Hurley
Teacher/Researcher, Education Queensland
Australia

My school has started the Habits of Mind program for three years. I have been thrilled in reading this book because it gives us great ideas and examples in translating the habits into practical situations. I strongly recommend this book to principals and teachers of schools implementing the Habits of Mind program.

Dr. David G.S. To
Principal
United Christian College (Kowloon East)
Hong Kong
If you are planning for a year, sow rice;  
If you are planning for a decade, plant trees;  
If you are planning for a lifetime, educate people.

Chinese Proverb

If you are planning to educate people to behave and think intelligently, teach them the habits of S.U.C.C.E.S.S.
Dedicated to the memory of my mom

TAN ANG NEOW
1931 - 2005
My deep appreciation goes to the following people who helped in the process of writing this book:

My wife Gaik, who helped to pore through endless pages in her role as editor-in-chief.

Tony Buzan who has given me the gift of Mind Maps that was instrumental in the planning of this book.

Donna Passey who helped to edit as well as draw some of the mind maps.

Dr Yeap Lay Leng who helped in researching on various topics and who trawled through thousands of pages on the internet.


Friends who invested their precious time reading through the manuscripts and provided their invaluable and insights and suggestions for improvements especially Professor Robert Garmston, Dr Ang Peng Hwa, Dr Gabrielle C. Hurley and my sister Mary Toi.

Finally, my deep appreciation to Professor Art Costa, who has been my coach, mentor and inspiration for this book.
In 1997, it was serendipitous for me to listen to a lecture by Professor Arthur Costa when he was in Singapore for the 9th International Thinking Conference. At the lecture Art spoke about the ways intelligent people behave and how we can become intelligent by cultivating certain mental habits that characterise these intelligent people.

The points that Art Costa made during that lecture kept haunting me. I wanted to know more about these intelligent behaviours. After spending some time researching, I became convinced that everyone should be taught how to think intelligently, and that developing mental dispositions is the best way of teaching thinking. Costa’s framework outlining the 16 habits is an excellent one, not only to teach thinking but also to cultivate sound mental dispositions over time.

It is my hope to share Professor Costa’s work through this book. I have reorganized the 16 habits into seven strands called S.U.C.C.E.S.S. In keeping with the habit of finding humour, I have included lots of humorous stories. I have also included crosswords and other puzzles to make learning more fun and engaging.

As a Buzan Master Trainer, I had naturally applied Mind Maps to the habits of S.U.C.C.E.S.S. and have dedicated Chapter 12 to describing how Mind Maps help you to cultivate the habits of S.U.C.C.E.S.S.
Psychologists have found that the human intellect has a limited capacity for handling variables. Miller describes this as “M-space” or Memory Space. He found that humans have a capacity for handling and coordinating seven different variables, decisions, or disparate pieces of information at any one time (plus or minus two). Most adults can operate on four or so disparate variables simultaneously.

When humans approach the outer limits of their capacity, a state of stress begins to set in, and there’s a feeling of loss of control. Much intellectual energy appears to be invested in techniques and systems to simplify, reduce, and select the number of variables.

Because remembering 16 Habits of Mind exceeds the number of variables the human brain can handle easily and therefore may be stress-producing, Henry Toi has given us a simple, manageable and productive classification system: S.U.C.C.E.S.S. Even the acronym conveys the intent and origins of the Habits of Mind. Synthesized from the study of attributes of successful people in many walks of life and therefore, aspiring ourselves and others to be successful as well, Henry has consolidated the Habits of Mind into a simplified and easier to remember form.

This book, however, goes far beyond a classification system. With a pertinent and pithy quote on each page, a theoretical framework is presented relating the Habits of Mind in a
more “modern” view of intelligence. Connections are made with research on brain functioning and the neurosciences. Each of the Habits of Mind is defined and illustrated in delightful ways using vignettes, humorous events and jokes. Henry's expertise and mastery of mind-mapping exemplifies and details the components and skills underlying each Habit of Mind. Furthermore, helpful suggestions, practical teaching strategies and engaging activities and games to help others become aware of, practice and apply the Habits of Mind are included.

This book is a testimony to Henry Toi’s devotion to continuous learning. It represents his persistence to stay with this project through to completion, to strive for accuracy by editing and perfecting the manuscript, to think interdependently with other scholars in the field, and to communicate ideas with clarity and precision. He finds humor at each turn, draws forth an immense amount of previous knowledge and experience and illustrates his thoughts using mind maps—a form of displayed metacognition.

This book makes a welcome addition to the burgeoning interest in the Habits of Mind throughout the world and will be useful to teachers, parents, community leaders and business executives as they infuse the Habits of Mind into their schools, homes, factories and offices in an effort to make them even more thought-full places.

Arthur L. Costa
Granite Bay, California.

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how to read this book

This book is written for teachers, parents and anyone seeking to help their students and children become more skillful thinkers.

The first two chapters of this book provide background information. They describe the changing needs of the global workplace, the need for education to keep pace with it and the latest discoveries in the field of neuroscience and how this affects the way we learn and teach.

Chapters 3 to 11 describe the mental habits that make for successful thinking. These are the habits of mind that Professor Arthur L. Costa and Dr. Bena Kallick discovered are the common traits exhibited by successful individuals from all walks of life.

The Mind Maps at the end of each chapter serve as a chapter summary. There are also crossword puzzles and various word games at the end of each chapter describing the mental habits. These games are designed to add fun while increasing your understanding of that habit. The humorous stories relating to each habit are added to illustrate the habit of finding humour and to enhance learning and memory. Practical ideas on cultivating the habits can be found in chapter 11. The stickers at the end of the book can be used to paste over the black & white version on the chapters cover pages or used in any other way to remind yourself of the habits.
Raison D’etre
The Road To Intelligence - The Landscape Changes...

On Feb 24, 2005, I was driving at night along a busy road when I noticed a well-equipped cyclist riding on my left. He was strapped from head to toe in safety gear, from a fashionable helmet to elbow and knee guards. I overtook him. Then, at a road junction, as I was waiting for the lights to turn green, I saw him coming from behind. He chanced upon a moment of opportunity when the cross traffic was thin and shot past the red light.

What an incredibly foolish thing for the cyclist to do! At first glance, in all appearance and style, the cyclist was following all safety precautions and would have been credited with being a “safe” cyclist. However, his behaviour was incredibly unsafe. We make the same mistake when we equate knowledge and passing exams with the ability to process information and solve problems intelligently.

In the past there is a common perception that if people can demonstrate that they have lots of information, they are intelligent. Increasingly, this perception is changing as we realize that in order to operate intelligently in a multi-ordinate world, skillful thinking is prized above just having lots of information.
In numerous surveys around the world, employers have lamented that they are disappointed with the product of the school system. Laura Tyson, dean of the London Business School, commenting on a recent (2004) survey of 100 executives said, “MBA graduates requirements could be summed up as follows - the need for more thoughtful, more aware, more sensitive, more flexible, more adaptive managers who could be moulded into global executives.” These 100 executives were from 20 companies such as US General Electric, Swatch Group, Banyan Tree Hotels and Resorts.

Tharman Shamugaratnam, Singapore’s Education Minister, aptly puts it that education needs to be restructured to produce people with “what the real world looks for.” Its key function should be to prepare people for the “test of life” rather than students for a life of tests.

Ever since the term “intelligence quotient” was made ubiquitous after Alfred Binet coined it in 1905, the definition of intelligence has been the bugbear of many educational psychologists. Over the years the rift between what IQ stood for and what it stood against became increasingly discomforting for many researchers. While IQ became a simplistic way of defining what was once a fuzzy idea, it also threw up many more questions that demanded answers.

The first question that begs the world of IQ is “Can IQ (or intelligence) be increased with training?” Research has since proven that through instructional training, IQ can certainly be increased. The quantum however is debatable, ranging from a few points to a respectable one standard deviation (about 15 points). In a study by Lloyd and Humphrey, IQ scores jumped 15 points between 1917 and 1942 due to better education.

The second question is “Is IQ a good predictor of success in life?”
Increasingly research by educators such as Howard Gardner and David Perkins, and our own experience is showing us that IQ is not a good predictor of success in life.

While recent research and discoveries in the world of education may shift the focus from IQ, it begs another question; “What then should we be teaching our students? What skills can we equip them with that would still be relevant in a society they will inherit 20 years from now? How can we teach them to be intelligent? What skills would be needed to create a more thoughtful, considerate, and intelligent society?

A quick survey of the landscape reveals that there are several major landmark discoveries and thinking in the field of intelligences and teaching for thinking that have left their mark in the world today.

1905
Alfred Binet developed the IQ test to measure the intelligence of students in France. In 1904 a French psychology group “La Société Libre pour l’Etude Psychologique de l’Enfant” which Binet was a member of, was commissioned by the French government to create a way of identifying students in need of alternative education. This led Binet to the development of the I.Q. tests. In his pursuit, Binet wanted to find a way to measure the ability of normal children to think and reason in any particular field.

He developed a test in which children were asked to do tasks such as following instructions, copying patterns, naming objects or putting things in sequence or categories. He created his scale by giving these tests to a wide range of children. For example if 70 percent of a population of 10 year olds passed a particular test, then success on the test represented a 10-year old’s level of intelligence.
The I.Q. then is a ratio of the “mental age” to chronological age, hence the term quotient. Therefore 100 represents the average, or the 50th percentile. So an 8-year old who passes the 10-year old test would have an I.Q. of $\frac{10}{8} \times 100 = 125$. This Binet test was used by the US government to classify a vast number of recruits during world war I.

Binet was aware of the limitation of his scale. He expounded on the diversity of intelligence and the need to study it from a qualitative perspective in addition to the quantitative aspect. He conceded that intelligence varies with environmental factors and is not solely determined by genetics.

1974
Tony Buzan, inventor of Mind Maps, coined the term “Mental Literacy”, which means having the knowledge and understanding of how your brain works. He was intrigued by the workings of the brain. He believes that intelligence has been too loosely defined and that everyone, given the right techniques, can increase their intelligence. The research into the brain and how it works are only at the seminal stages and there is so much we have yet to understand. Buzan believes that people can become more intelligent if they are taught the right formulae in connection with how their brain works. Therefore, central to the work of Buzan is teaching people to know how to learn, process information, think and develop themselves (both mind and body) for increasingly better human performance. He also coined another term “holanthropy” to describe the process of understanding the relationship between mind and body and how to improve the quality of thinking and living.

1983
Howard Gardner, Professor of Cognition and Education at Harvard
Graduate School of Education, published his theory of multiple intelligences. Gardner postulated that it is too simplistic to think about intelligence as a single dimension like an IQ score. While Alfred Binet and his associate’s work developed a platform to define and measure intelligence, Gardner believed that this alone was inadequate. For him, it does not explain the multiplicity of intelligences and it does not provide a good correlation with the observed behaviors of intelligences in real life experiences.

For Gardner, intelligence means “the ability to solve problems and to create products or services that are valued in a society.” After much research, he postulated that a human being has eight definable intelligences namely:

1 Musical,
2 Inter-personal,
3 Intra-personal,
4 Kinesthetic,
5 Mathematical/logical,
6 Naturalistic,
7 Verbal/linguistic and
8 Spatial.

Each of these intelligences can be developed with proper training.

Circa 1990
David Perkins, Senior Professor of Education and founding member of Project Zero at the Harvard Graduate School of Education, proposes that there are three components of intelligence: neural, experiential and reflective intelligence. Of these three, neural intelligence is what you have been born with, somewhat inherited. Experiential and reflective intelligence can be gained and taught. Experiential intelligence is gained through situational
learning and is developed in relation to specific skills, such as a job or a trade. Reflective intelligence is what he terms as “mindware”, and it can be advanced through learning.

Circa 1992
Arthur Costa, Professor Ementus of the California State University, defined the ‘habits of mind’ as a set of intelligent behaviours that will help people become more thoughtful. These habits are formed over time much like the way rivers, ravines and mountain ranges are formed over time by the repeated action of water and wind over the landscape. The habits of mind are a combination of both cognitive as well as affective aspects of human behaviour. These powerful combinations have been used in schools and in various parts of the world to develop proficient thinkers and problem solvers.

The “new” story of the Tortoise and the Hare (Part 1)

Somewhere in the bRain Forest, there was once a tortoise named Toto and a hare named Harry. Toto and Harry lived in the bRain forest. They were part of a community of animals that lived very well with each other.

Each animal knew that they were born with some natural attributes. Toto, although he could not run very fast, was a good thinker. He also had a pretty hard shell to take the hard knocks that he encountered in the forest, such as if a fruit were to fall on him. Harry however had a soft body, but he sure ran fast. One cool breezy evening the animals sat around the fire and started to ask philosophical questions. Larry the lion wondered if each animal could train themselves in other skills. That question started everyone in the forest thinking.
The next day, Rocco the raccoon felt that perhaps one way to find out if they could add to their skills was to put it to the test. He suggested that Toto and Harry race each other. In the first race, all the animals came to watch them as Toto and Harry went to the starting point. As the chief cockerel gave a loud cry, off they went. As expected, Toto ambled along as hard as he could while Harry hopped quickly into the horizon. Not too long after that, Harry came bouncing in to the finish line and won the race.

That evening, the animals sat round the fire and had a discussion. Larry felt that while Harry had won the race, it was rather unnatural. Ophelia the Owl wondered what Larry meant? Larry explained that in his prowling, he observed that actual paths taken by all the land animals usually covered hills, valleys, rivers and muddy terrains. He suggested that the real test of skills should cover all of these areas.

The animals concurred that a second race should be organized, this time, covering all the terrains.

At this second race, even more animals came to watch. Some curious animals from the neighbouring forests came too, as word had spread that a unique test was about to take place in the bRain forest.

Off they went, and Toto ambled along, while as usual Harry bounced away. Soon they came to the river. Harry knowing that he could not swim, had to wait for his friend Coco the crocodile. While waiting for Coco, Toto arrived at the river bank and effortlessly glided into the water and waddled his way across the river. Finally after an hour's wait, Coco came along and gave Harry his much needed ride across to the other side. Harry hopped quickly and managed to overtake Toto. Then a nasty sight confronted Harry. It was a mud patch. Harry let out a big sigh and jumped onto it.
The mud gave him no bounce and so he trudged slowly across the patch, halfway through, Toto glided and slid past him. Then came the hill, Harry felt the pull of gravity draining his energy, while Toto, because of his low center of gravity, was able to match the speed of Harry.

At the finishing line, both Harry and Toto came in almost neck to neck, but Toto won this time.

At the fireside conversation, Larry made his grand observation. He believed that each animal had different skills that allowed them to handle different problems well and that they would do even better if they could best learn the skills from each other, so that they could be even better! So Harry while learnt how to swim Toto had some training to make his flipper turn faster. Both were also taught many strategies to help solve problems they might face in the bRain forest.

Larry announced confidently at the subsequent fireplace conversation that he thought that bRain Forest had found new ways to make their lives better. And so Larry thinks...

Making Education Relevant.
We have been stuck to a way of education, largely unchanged since it was established 150 years ago. We have inherited an educational system that has arisen from the needs of the Industrial Revolution which took place almost 150 years ago. This was followed by the information revolution, the computer revolution and the telecommunications revolution and now we are at the cusp of the learning revolution; but many attitudes and assumptions about education remain unaltered. At the time of the industrial revolution, basic skills were lacking as
people from the farming communities flocked to the big cities to find more lucrative work. The need then was to teach people to read, write, count and carry out instructions. Less process thinking was required as most workers were deployed on production lines. In those days, information and knowledge were scarce commodities. As the industrial revolution created more jobs and wealth, it fuelled consumerism and opened the doors to increased information flow through newspapers, magazines, books, television and radio. Information became readily and cheaply available. With increased information flow, people began to question and think more, but nevertheless, such skills were scarcely taught. With the advent of computerization, the mundane and laborious work were taken over by machines leaving workers to do more “value-added work” otherwise known as “thinking work”. However, thinking skills were almost never taught.

Following improved productivity brought about by the age of computers, there are now more elaborate and portable devices in telecommunications made available and with the internet and the explosion of information and knowledge, workers now have access to instant information on a 24 by 7 (a term used largely by the information and technology sector to mean 24 hours, 7 days a week) basis. With global information and knowledge available at the price of a broadband subscription, what is most needed now are workers who can process the information, assess its reliability, cross reference it and make informed decisions on the go. Such skills are scarcely taught.

While the world has experienced four significant revolutions that have altered the way we think, communicate and live our lives, education and the way we are taught have remained largely unchanged. This is out of sync with the “needs of the real world.” We are using 15th century tools to fight a 21st century
Brain – The Seat of S.U.C.C.E.S.S.

Around the 4th century A.D., great thinkers like Aristotle said that “…the brain is an organ of minor importance… the seat of the soul and the control of voluntary movement-in fact, of nervous functions in general-are to be sought in the heart.” They were misled into thinking that the brain is an organ of minor importance. Even today many people are hardly conscious about the performance of the brain let alone are able to use the knowledge of neuroscience to maximize its performance.

The brain is indeed a difficult organ to study. During the early days of brain research, researchers often had to insert a probe into the subject’s brain and use weak electrical signals or physical stimulation to study the functions of different parts of the brain. In other experiments, sometimes the subject animal had to be killed and its brain examined under the microscope in order to deduce effects of certain prolonged stimulus.

Neuroscientists and psychologists believe that the past 18 years was an era of great emphasis on and discoveries about how the brain functions. In fact the decade of the 1990s was declared the ‘decade of the brain’. The invention of instruments such as the MRI scan, PET scans and EEG and many other forms of

No problem can withstand the assault of sustained thinking. Voltaire
non-invasive methods of examining the brain and its functions was like the invention of the microscope to the biologist or the invention of the compass to the early explorers. Such is the significance of the era we now live in. There has been more knowledge discovered in the past five years than in the last 300 years! Despite all of this new knowledge, Nobel Laureate, Murray Gell-Mann said “… In most spheres of knowledge, what we don’t know far exceeds what we do know. Brain research is no exception….”

Four main types of tools were responsible for the much of the recent knowledge acquired about brain functions.

- **MRI - Magnetic Resonance Imaging**
  In this process, the body is exposed to a magnetic field, which reflects off the body. Through the reflection the machine can measure the energy. Recently, an additional technique called ‘functional MRI’ allows researchers and scientists to view a continuous moving image of brain activity.

- **PET - Positron Emission Tomography**
  In PET scans, the subject is injected with a tracer chemical containing an isotope that gives off particles called positrons. This chemical is very close to the molecular structure of glucose and therefore tricks the brain into using it like glucose. Since glucose is the chief fuel used by brain cells, this form of scan allows scientists to detect brain activity.

- **EEG - Electroencephalogram**
  EEG detects and records brain waves and can be used to study how the brain reacts to various environmental factors.

- **MEG - Magnetoencephalography**
  Magnetoencephalography (MEG) is a non-invasive technique

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*Human history becomes more and more a race between education and catastrophe.*

— H.G. Wells
for localizing and characterizing the electrical activity of the central nervous system by measuring the associated magnetic fields emanating from the brain. Every current generates a magnetic field (according to the right hand rule of physics). This same principle is applied in the nervous system whereby the longitudinal neuronal current flow generates an associated magnetic field.

Beyond the womb’s gates.
If we consider that a staggering 60% of the human genes are dedicated to brain development, despite the fact that the brain only forms about 2% of the adult body in weight, we begin to understand the importance nature has placed on the brain.

Ironically, it was not until recent years that we have begun to place some importance on the workings of the brain and how we can make better use of it. Previously we had far more knowledge of how the heart or the kidneys work than how the brain works. Now we are entering an age of an explosion of knowledge about the brain.

It is now known that after birth, most of the one million million or so neurons do not form connections and when they do not do so, they die. It is interesting to note that these connections are formed by early childhood experiences and so allows the brain to “localize” the development. In a way it is like a computer’s hard disk drive, it is only loaded with some basic “operating system” but the actual application software has not been loaded because the computer has not been “told” what its function would be.

Because of the complexity of forming the human brain, the genetic coding required to “predetermine” the functions it needs to perform would be too demanding a task. It therefore creates more neurons than it would eventually require and then allows the environment

College is not the place to go for ideas. Helen Keller
to shape the synapses that these neurons will form. Unformed synaptic pathways will then eventually die (deconstruct). Other researchers, who take the more Darwinistic approach, believe that the excess neurons are actually there to allow for the person to interact with the environment, more interaction, the more connections and therefore more neurons will be preserved. shall examine this effect later in greater detail. Peter Hutenlocher, Professor of Pediatrics & Neurology at the University of Chicago, observed that a child’s brain has many more synapses than an adult’s. density of synapses remains high until about 10 years of age, after which they gradually decline until late adolescence when only about half of the synapses remain. Thereafter the number remains relatively constant (or so it is thought).

In the early years, a child’s brain forms as many as twice the synapses found in an adult’s. If synapses are continually used, they stay active, otherwise they die. Although cell death takes place constantly, a heighten period occurs during puberty.

Forming connections is the key task of brain development and brain development is affected by nourishment, environment and the stimulation a baby receives before and after birth. Each neuron is capable of connecting to at least 15,000 other neurons, forming the neural pathways. 75% of brain development occurs outside the womb and this fact has profound implications for cognitive psychology. It logically means that the learning that takes

Education is a method whereby one acquires a higher grade of prejudices.
Laurence J. Peter
Neural pathways grow very quickly in the first three years of life. By 3 years of age, a child’s brain is 2.5 times more active than an adult’s. A child has a higher level of neurotransmitters and utilises more glucose in the brain.

When a child reaches the age of puberty, the neurons in the brain start to trim. Brain cells (neurons) that have not formed neural pathways are trimmed off. When a stimulus activates a neural pathway, the synapses in that pathway receive a chemical signal. With repeated stimulation, this pathway becomes more efficient, that is, the signal becomes stronger by virtue of the increased efficiency of the neural pathway. When that strength reaches a threshold, the synaptic connection becomes immune to the trimming process. John Pinel of the University of British Columbia noted that the reason why neurons die is because they cannot not access neurotrophins, life-preserving chemicals that are supplied to neurons by the action of a stimuli. The absence of neurotrophins triggers a program inside the neuron that causes it to kill itself.

The trimming process is therefore directly related to the amount of learning that has taken place. A child who has the opportunity to engage in more learning would have a denser, more connected brain when they pass into adulthood than one who has not. In this sense a dense brain is a contrary to the derogatory term of being “dense”.

**Neurons go through 3 stages of development;**

1. Proliferation

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75% of brain development occurs outside of the womb and this fact has profound implications for cognitive.

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The brain is a wonderful organ. It starts working the moment you get up in the morning and does not stop until you get into the office. Robert Frost
2. Migration
3. Differentiation

Proliferation occurs during cell division by mitosis. This happens during the prenatal period with the seventh month (after conception) marking the end of the proliferation process.

After the cells are formed during the proliferation stage, they migrate to their permanent places in the brain. This takes place during the first 5 months (after conception). Thus the 2 stages of proliferation and migration overlap each other. The migration process is very important, because “mistakes” in migration will give rise to learning disorders such as dyslexia and schizophrenia among other conditions.

The third stage is differentiation. This is when the neurons grow in size and start making connections with other neurons. Synapses are formed during this stage.

Overall, the brain goes through another developmental growth phase called cerebral lateralisation. During this phase, the two halves of the brain (cerebral hemispheres) become specialised in function. In right-handed people, the left hemisphere is specialised in processing phonetic, syntactic and certain semantic aspects of language, as well as analytical, logical or temporal information. The right hemisphere is better at processing intonational and pragmatic aspects of language as well as non-verbal, spatial and visual information.

Myelination

Myelin is a fatty substance that surrounds the axons of neurons and helps to speed up the transmission of electrical impulses.

I have never let my schooling interfere with my education. Mark Twain
In a modern analogy, it is like the insulation around an electrical wire that helps to prevent electrical leakage.

When an axon is myelinated, it requires less electrical signals to send the message across; in other words, it is more sensitive to stimulation.

The myelination process is slow, beginning from life in the womb to adolescence and even beyond.

The sensory system is the first to be myelinated. This happens when the baby is still in the womb and is completed by the first 12 months after birth. Essentially this process ensures that the baby is born with fully developed sensory abilities. If we can postulate, the sensory system is developed to enable the baby to respond to its environment and to start making sense (learn) from the sensorial inputs of the environment. Dr. Maria Montessori hypothesised that the greatest and earliest experiences of learning comes from the five senses. She therefore created a systematic method of teaching using the five senses. She termed this sensorial education. Sensorial education should begin at birth. Children should be encouraged to use all their senses to learn. Parents in particular should not discourage their children from touching, smelling, tasting (appropriately), hearing and seeing.

The second system of neurons to be myelinated is the motor areas. Other areas of the brain responsible for language, mathematical calculations for example are slower to be myelinated. These tend to take place continuously right through into the early teens. While myelination increases the speed of transmission, it also has the added effect of filtering out interference to the cognitive processes in the neuronal activity. This means the child is able to focus on the task and become more attentive. However the
implication of this is that it is also more difficult to change the cognitive behaviour.

David Bjorklund, Professor at the Florida Atlantic University, believes that myelination is largely under genetic control because experiments on animals showed that the environmental factors only resulted in about 10% to 20% of change in the myelination processes. This is an important factor to consider in the educational development of children and provides more evidence to support the concept of sensitive periods in education.

The neo cortex is the part of the brain that is associated with higher order thinking. It consists of two roughly equal halves (hemispheres), connected by a central bunch of nerves called the corpus callosum. The neo cortex can be divided into regions. The prefrontal lobes are involved in higher cognition, but an interesting research revealed that one important function of the prefrontal lobes is the inhibition of responses. In experiments on infants on the A-not-B object permanence where a toy is hidden in one of two wells, the infants are distracted for a delayed period of time and then allowed to retrieve the toy. Piaget reported that infants below 12 months of age have great difficulty in performing the task. The infants cannot inhibit their behavioural responses to look for the toy at the last well they have seen it.

Never Too early

Nobel prize winners, David Hubel and Torsten Wiesel conducted experiments on kittens. In one experiment one eye of newborn kittens were covered for several months. When the scientists uncovered the eye, they were surprised to find that it was effectively blind, there were no neural pathways connected to the brain, despite the fact that the eye was perfectly functional and normal.

\[
\text{Estimated amount of glucose used by an adult human brain each day expressed in } M & M's \text{ is 250. A non-author's comments: While this quote is in jest, the brain's main source of energy is really glucose.}
\]
The brain had not received any signals from the eye and therefore did not wire itself to receive such information. The second eye, which was not covered, had developed neural connections that would normally have been reserved for the other eye.

In humans, brain development continues until about 10 years of age, after which a process called trimming occurs. This trimming occurs more in the cerebral cortex, where cognitive processes are governed. On average 33 synapses are eliminated every second. This process allows the brain to “focus” on the neural pathways that are stronger and which have been more “useful” to the person.

The start of the trimming process coincides with empirical evidence of the critical periods of language, music and kinesthetic learning.

Harry Chugani, Chief of Pediatric Neurology and Development Pediatrics at the Michigan Children’s Hospital, Wayne State University, noted that until about age 12, the human brain could master cognitive functions that adults learn with more difficulty. Examples are; learning a new language or playing a musical instrument.

Harry Chugani and his colleagues have established that there are time spans when certain parts of the brain are more sensitive to environmental influences. Critical periods do not exist for the brain as a whole, but it seems that there are parts of the brain’s circuitry that develops in waves. By studying the PET scans of the children who visited Chugani’s hospital, they discovered that at one month of age, the region controlling sensory-motor functions exhibits high activity, by the second to third month of age, the visual and auditory areas show greater activity than the rest of the brain. By eight months of age, the area of the brain responsible for emotions gets active.

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I prefer the company of peasants because they have not been educated sufficiently to reason incorrectly. Michel de Montaigne
Swiss educational psychologists Jean Piaget concluded almost 70 years ago that most children prior to the age of 12 are incapable of philosophical thinking. Essentially that means they are incapable of engaging in metacognition. Gareth Matthews (1980) argues, with evidence that they can. He conducted experiments with children below 12 and engaged them in philosophical discussions. Matthew Lipman, Professor of Philosophy at Montclair State College and Director of the Institute for the Advancement of Philosophy for Children, an advocate of teaching philosophy in schools went further to say that teaching philosophy to children enhances critical thinking skills. Such new information is beginning to alter the way we teach our children.

Never Too Late

New research at the University of Illinois at Urbana-Champaign is revealing that in older people training re-ignites key areas of the brain and can offset age-related declines, therefore boosting cognitive performance. Participants were 32 men and women, ages 55 to 80, and 31 younger adults. Kirk I. Erickson, a research associate involved in the study commenting about the effect of training on brain of young and old subjects, said that "Both old and young react pretty much the same way, even though they started differently," Erickson said. "Their brains do pretty much the same things with training."

Judy Foreman, a Lecturer on Medicine at Harvard Medical School, believed that much of what scientists have learned over the past decade, was too pessimistic. The aging brain is surprisingly "plastic" - capable of remodeling itself, growing new cells, and compensating in remarkable ways for the very real losses in processing speed that come with aging.

The human brain starts working the moment you are born and never stops until you stand up to speak in public. George Jessel
In 1998, a team led by Fred H. Gage, a neuroscientist at the Salk Institute in La Jolla, California, showed that, contrary to popular belief, the adult human brain contains cells that can divide and become healthy, new neurons. What was really exciting was the fact that these dividing brain cells were found even in the hippocampus, a region crucial for learning and memory. It was also discovered that even in people as old as 72, dividing cells were present! The wonderful news is that the adult brain retains the capacity for cell genesis and neurogenesis and this capacity persists throughout life.

Additional research has revealed that the brain as an organ of learning has a biological need to keep learning. Once learning stops, the brain deteriorates quickly. Dr. Margery Silver, Associate Director and the chief neuropsychologist of the New England Centenarian Study, said that the brain has a biological need to learn. The more a person learns, the more he has the capacity to learn, thus each time the brain cells are make new connections and pathways and this then helps the person to stay highly functional.

More Change More Brain

There is a sea anemone that once it has found a place to attach itself actually eats its own brain, as it no longer needs one. Research in that area has shown that organisms that move the most and are constantly facing a changing environment have more highly developed brains. The main need is the ability to learn to adapt to its surroundings.

If we consider that the function of the lungs is to facilitate the exchange of gases essential to the function of the body, the function of the kidneys is to clean the blood of waste and the function of the stomach is to digest food so that the nutrients can be extracted

Education is the ability to listen to almost anything without losing your temper or your self confidence. Robert Frost
by the intestines, then the function of the brain, must be to learn and to adapt! (We are speaking mainly of the cerebral cortex, as other parts of the brain such as the mammalian brain are known to regulate temperature, hormones and other essential chemicals for control of muscular functions etc).

This is now truer than ever as the human specie itself is constantly creating and recreating its own environment and needs even more learning skills. Therefore, in an increasingly fast changing society, and with the need to become more adaptable to our environment, we need a bigger brain. Or may be just a more efficient one?

Beliefs and Training

In the area of educational psychology on motivation, brain research is still very dependent on empirical evidences. In a series of studies done by psychologist Robert Rosenthal (beginning in 1968), he told a group of teachers that certain students were expected to excel in their studies because of a test he gave to the students at the beginning of the school year. These IQ tests however had nothing to do with the predictions. Rosenthal simply drew the list of students at random. When this group was retested at the end of the school year, they actually improved on their IQ score by an astonishing 15 points over the others (control group) who were not “selected”.

This and other tests Rosenthal engaged in and proved empirically that a teacher’s high expectations have an impact on the performance of the student. In this case it was measured by IQ score, but it would probably be true in other areas such as art, music or even behaviour.

Nevertheless, there is only so much that changing beliefs can achieve. If we couple the beliefs with a well-structured, well-researched

To repeat what others have said requires education, to challenge it requires brains.
Mary Pettibone Poole
method of training, tremendous improvements can be achieved. General cognitive psychology believes that the brain can comfortably take in a memory load of about seven items. It is believed that memorizing more than 30 digits, spoken at one digit a second would be almost impossible. In 2004 at the World Memory Championship in Manchester, Clemens Mayer recalled perfectly a 198-digit number spoken at a rate of one digit a second. The cognitive limitation of the human brain has been breached by “ordinary” people who have been taught how to use it the way it was designed. Tony Buzan has been teaching and encouraging people to know how to use their brains and to break the often self-imposed limitation of human cognitive abilities.

Habituation Builds Capacity

When synaptic pathways are stimulated, a chemical signal is stored. Repeated activation increases the strength of pathways and after a number of repeats, pathways stay fixed, forming a habit. Neurological studies in animals, show that after a single repetition, there is a drop in the neuron activity when the activity is presented again. This also leads to reduced blood flow and indicates a tuning of neural activity and the degree of attention the brain gives to it also decreases. Experience this effect in such aspects as driving. The process of driving the car has become so well learnt that it does not take up significant amounts of the mental processes. The same effect is felt in the search for directions, the route you take has been traveled many
times, it becomes almost instinctive and you can focus on other
cognitive activities like speaking to someone or thinking about a
problem. However it becomes very difficult to engage in a cognitive
discussion when looking for a new route.

The “new” story of the Tortoise and the Hare (Part 2)

Back at the bRain Forest the new campaign to teach new skills was
well underway. One day, while Larry was taking a drink by the
river bank, he spotted Harry sitting idly nearby. Larry found out
that Harry was waiting for Coco. In his conversation with Harry,
he found out that while Harry knew how to swim, he was not really
comfortable swimming and so, still preferred to wait for his friend
Coco to help him cross the river. When questioned, Harry could
explain how swimming takes place, but he rarely uses it, even when
the situation requires it. Disturbed he sought out Toto and asked
him if he too seldom applied the new strategies he had learnt.
Toto similarly told him that he felt unnatural swinging his flippers
so fast. He gave excuses that the action gave him flipper cramps.
But again when questioned about the skills, he could explain
to Larry what he knew about flipper exercises and how to make
them go faster.

Larry was now greatly disturbed. He called for an urgent meeting
that night. He discussed the problem with the community.
Ophelia the owl hooted that she had heard similar problems in a
forest called Habit(at) Forest somewhere far across the land.
She had heard that they had found a new way of overcoming those
problems. She volunteered to go visit and find out how they solved
the problem. A few nights later, Ophelia came back excitedly to
report that the Habit (at) Forest realised that the new skills have to
be habituated so that it becomes natural for the animals to

There are many questions which fools can ask that wise men cannot answer.
George Polya
use them. Larry quickly formed a task force and developed a new way of infusing the skills in their education, at work and at home, so that these skills become habituated in the animals. Over time, the bRain Forest became a thoughtful place to live, work and play.

Looking for new keys

Acquiring knowledge is the old key that unlocks the door to success in the old world. A new key is required to unlock the door to success in the new world. This new world has a different definition of human excellence. It defines excellence as the ability to think skillfully. Professor Costa believes that we need to change the curriculum mind set from teaching people how to obtain answers to teaching people how to behave and think when answers are not immediately apparent. This requires not just knowing the thinking skills and strategies, but also having the predisposition (habituation) to use them. The processes that are valued in this new world can be summed up in seven mental traits, derived from Professor Costa’s Habits Of Mind:

- Suppleness in thinking
- Understanding the world around him
- Constructive thinking in his approach to himself and others
- Courageous thinking and daring to think differently
- Exactness and precision in his communication and thought processes
- Self-Management skills
- Skilled in the use of “silliness” in that he employs humor in the right context to enhance thinking and communications

Learning to Think Skillfully and Developing the Habit to Do So

Learning has taken place when the people find that they are capable of acquiring, extending, refining, integrating new knowledge and

The more man meditates upon good thoughts, the better will be his world and the world at large. Confucius
skills from the environment to perform new tasks. Further evidence of learning having taken place is when people are able to apply and transfer such new knowledge and skills to a variety of circumstances and abstract meaning from what they do to allow them to make meaningful decisions for themselves.

Thinking can be viewed as a predisposition to the way information is processed or a response is formulated. This view of thinking is based on a learned behavioral response to stimuli such as information or self-generated thoughts. It gives rise to the commonly used phrase such as “What would Peter think about this?” Inherent in this question is asking how Peter’s thinking disposition and processes and experience would have impacted the decision.

The human capital is a factor increasingly recognised as THE critical success factor of the organization. The current view of learning has been shaped by globalization of markets and increasingly characterized by uncertainty, changes in manufacturing processes, new initiatives demanding problem-solving and cognitive approaches from the employees.

Worldwide trends towards globalization, entrepreneurship, terrorism, managing turbulent changes, accelerated technological change, managing in the information age, industry restructuring, increased public scrutiny and other pressures on today’s businesses and the importance of harnessing intellectual capital for the knowledge economy are the impetus for the development of new initiatives in education. It is recognized that to survive economically, a nation needs to keep up with:

- the accelerating pace of change in performance improvement
- development of learning organizations that are change-ready and change-adept
- business renewal, turnaround and transformation

The fool wonders, the wise man asks. Benjamin Disraeli
• innovation and growth
• recognizing the difficulty of moral decision-making in real-life
• an emphasis on the importance of cultivating a tolerance for ambiguity, a capacity for complexity and an ability to hold multiple perspectives in view
• moral issues, ethical dilemmas, issues of personal character and the need for sound and practical judgment

Learning is crucial to understanding the individual, work and organization. Organizations only learn through individuals who learn. To meet organizational goals, the needs of the learners must be met. While individual learning cannot guarantee organization learning, without it, no organizational learning occurs. Individuals must learn for organizations to progress. The key skill to learn today is learning to think skilfully

Learning within educational changes:

All these underpin the need for educational changes. The current concern with learning manifests itself in fashionable expressions such as; learning society, lifelong learning, learning organizations, learning managers, professional development, continuing education, skills development, self-improvement, retraining and upgrading. This clearly represents not so much an upsurge of interest in the welfare of employees and development of individuals, but rather is a response to the new economic imperative of adaptability. This is also indicative of a learning environment that provides opportunities for individuals to improve their minds, knowledge and skills. Alexander Elliot, et al, (2000) rightly put it “what knowledge learners possess is a powerful force

People are not truly self-governing, unless they are free to fail. Stephen R. Covey
Author’s comment: People are only free to fail if they know how to learn and profit from it. (See S.M.A.R.T System of achieving your goal page 167)
in what information they attend to, how that information is perceived, what learners judge to be relevant or important, and what they understand and remember. Truly one’s knowledge base is a scaffold that supports the construction of all future learning (p.9). All these opportunities are ‘growth-oriented encounters’ in a knowledge and talent-based environment.

Dimensions of learning:
The ‘dimensions of learning’ (Marzano, Pickering and Tighe, 1993) is an instructional framework based on the best of what research and theory say about learning. Learning is crucial to understanding the individual, work and organization. Understanding these dimensions is crucial as they are essential to successful learning. They go beyond the traditional content of declarative (information) and procedural knowledge (strategies and skills) to establish learning outcomes that relate to lifelong learning.

The five dimensions of learning

1. Attitude and perceptions about learning. For learning to occur, individuals must have certain attitudes and perceptions. If an individual does not have a positive attitude about classroom tasks, he probably will not put much effort into them, therefore a primary focus of effective instruction is establishing positive attitudes and perceptions about learning.

For many students, schools provide the first model of an institutionalized learning environment. If this first model is poor, the attitude towards learning will be poor. If first learning experiences are militant, boring, painful and belittling, the mental attitude for future learning will be negative.

Comedy is simply a funny way of being serious. Peter Ustinov
2. Acquiring and integrating knowledge: Helping individuals to acquire new knowledge, integrate it with their prior knowledge and retaining it is an important aspect of learning. When content is new, a teacher’s instructional planning must focus on strategies to use prior knowledge into new knowledge, organizing the new knowledge as a scaffold for meaningful and applicable knowledge to make them part of their long-term memory through researched and well tested methodologies.

3. Extending and refining knowledge: Acquiring and integrating knowledge is not the end of the learning process. Learners extend and refine their knowledge, adding new distinctions and making further connections. They analyze what they have learnt in more depth and with more rigour. While extending and refining their knowledge, learners commonly engage in the following activities – comparing, classifying, making inductions, making deductions, analyzing errors, creating support, analyzing perspective and abstracting. Such highly metacognitive activities do not come naturally. Deliberate effort has to be made to teach these thinking skills and form them into positive predispositions and inclinations. Extending knowledge can be cultivated through the habit of continuous learning.

4. Using knowledge meaningfully: The most effective learning occurs when students are able to use knowledge to perform meaningful tasks. Planning instruction so that students have the opportunity to use knowledge meaningfully is one of the most important decisions a teacher can make. There are types of tasks that can encourage meaningful use of knowledge – decision-making, investigation, experimental/scientific inquiry, problem solving, and creativity. Making connections with the world around us and finding out as Leonardo Da Vinci did 500 years ago that “everything connects with everything else” creates in the learner a sense of wonderment about life!

My words fly up, my thoughts remain below: Words without thoughts never to heaven go. William Shakespeare (Hamlet Act 3 Scene 3)
5. Habits of Mind: The final dimension is having the mental disposition to act in an intelligent way. This can be further described as having the skills to think critically and creatively and having the mental self-regulation to respond to and adjust one's own thinking processes. Teachers and coaches aiming to integrate the fifth dimension should ask themselves the question “How will habits of mind be reinforced in this lesson/session”.

Relating the dimensions of learning
The five dimensions do not operate in isolation but work together. All learning takes place against the backdrop of the learners’ attitudes and perceptions (dimension 1). They are always factors in the learning process. Given that proper attitudes and perceptions are in place and productive habits of mind are being used, learning is a matter of acquiring and integrating new knowledge (dimension 2). Usually as the learner acquires and refines knowledge he extends and integrates it (dimension 3). While dimensions 2 and 3 are going on, the learner should also be using knowledge meaningfully (dimension 4) – engaging in complex tasks in unique ways and applying the knowledge to round up the learning process. Finally the learning needs to be habituated through developing the Habits of Mind. The most effective learning is a product of the interaction of these five distinct types of thinking that can also be termed ‘dimensions of learning’.

The ‘New Landscape’

**Shifting Mindsets in an information age**
The context of education changed dramatically when the world entered the Information Age. Successful learning involves a whole new mindset. People perceive, define, interpret and react to their environment in terms of mindsets.

A journey of a thousand miles begins with a single step. Confucius
Mindsets consist of experiences, beliefs, assumptions, frames of reference, shared schemes, cognitive mental models and learning. This provides a lens through which a person views the world, makes sense of events and situations, anticipates the future and reaches decisions and acts according to subjective personal judgment.

With the emergence of new challenges, individuals need to give up long-held assumptions and replace them with a new form of behavior. They need an open and dynamic mindset, forward pace with continuous change, new material orientation and conceptual skills. They need a mindset that is attuned to environment complexity and uncertainty.

Attitudes must adjust in order for people, regions and nations to be competitive. Individuals have to acquire a scientific bet, develop a certain rigour in their thinking and cultivate the capacity and inclination to turn knowledge into practical applications. They need to question knowledge that is handed down and challenge intellectual authority. The whole proverbial paradigm shift must take place.

The “new world” reality is that learning does not stop at the school gate. It therefore beckons the response that every organization must concurrently be an educational institution. It has to, as part of its survival and self-renewal process, develop educational programmes to sustain organizational growth. Key to this growth strategy is to imbue each individual to be a learner, a learning “guerrilla”, the smallest but most powerful unit of the learning organization.

The office as a classroom

The notion of the office or workplace as a giant, ongoing classroom

It is amazing what can be accomplished when nobody cares about who gets the credit.
Robert Yates
opens the doors to myriad opportunities for bosses and supervisors to integrate the dimensions of learning to continually educate the worker. Human resource managers and business owners should never underestimate the power of such a paradigm. The power of situational education is many times more productive and engaging than stand-alone courses. While courses are essential in learning new skills, situational learning allows the skills to be habituated in the worker and contribute to productivity and human capital.

The framework in this book is equally as applicable to the office and workplace as it is to schools, universities and homes.
Key Points of Chapter 2

- Habits = 5th learning tool
- Change environment, adapt, purpose
- Differentiate muscle, differentiate neurons
- Stage 3 > Stage 2 > Stage 1
- Adults = twice as active
- Genetics: 60% dedicated brain development, 75% brain developed outside womb
- Brain development new era
- MRI, PET, EEG, MEG
- Discoveries: 18 years
The Habits of SUCCESS

Why develop good thinking habits as a goal?

The answer is “because intelligence can be taught”. You can choose to become more intelligent. Whenever a thought is generated, regardless of whether it is self-generated or it is generated as a result of a stimulus (such as something we heard or an image we saw), it travels through certain patterned neurological pathways. This thinking pattern is much like the ravines that exist on mountain ranges. These thought patterns were formed as we “order” our thinking regardless of whether we are aware of the process. These patterns are shaped by past experiences and by frequent use of certain thinking habits and assumptions.

Referring to my earlier story about the cyclist, while the cyclist learned that it is good to have safety equipment like helmets, elbow and knee guards, he ultimately did not employ good thinking in crossing the traffic junction. The premise that having good knowledge will lead to good thinking is analogous to saying that any driver can drive a car well, as long as the car is designed well or that anyone can sing well as long as the lyrics and melodies are correct.
This mind-set has started to shift significantly in the last 30 years. Buzan discovered that one of the brain’s principle ways of learning is by mimicking. We can learn to think like master thinkers and mimic and emulate them. The habits of SUCCESS is a distillation of the essential habits observed and found in successful people throughout various fields of disciplines.

In 1995 David Perkins argued that there are 3 types of intelligences; neural, experiential and reflective. Neural intelligence is really the physical aspect, that is what you are born with. Experiential intelligence is garnered from the experiences that you gain as you go through life. This type of intelligence resides within realms of knowledge such as plumbing or medicine. Many forms of training in the workplace are targeted at increasing the experiential intelligence of the workers. When banks send their recruits to a course on lending, they will be taught how to assess the borrower's character, credit worthiness, the kind of business they operate and so forth. What the bank is doing is making their staff more intelligent in the area of lending.

What David Perkins was most interested in was reflective intelligence. This is the ability of the person to manage his thinking to various situations, even when the problem is outside his field of expertise. In other words, good thinking (not directly related to field of expertise) can be taught. For centuries, educators have believed that good thinking is a natural ability that manifests itself as a result of good genes. This idea however is not congruent with observable human behaviour. Good thinking does not come naturally. It has to be taught.

In the past, the weakness of poor “uneducated” thinking did not show up very much because the thinking content in most jobs was low. However, as the thinking component increased, the cracks
in the old model of education started showing.

This is analogous to sports. When competing in a weight lifting competition where each participant is only required to lift 1 kg, then whether or not you have well-developed muscles is not evident. However, when the weight to be lifted is 100 kg, then only will the strong, muscular people excel and become valued.

The need for schools to produce students who can think and behave intelligently is even more pressing now!

How can we increase our intelligence?
By adopting good thinking habits! Habits of S.U.C.C.E.S.S. is founded on the 16 habits of intelligent behaviours (Costa and Kallick, 2000). The ‘Habits of S.U.C.C.E.S.S’ are habits of mind reorganised into seven strands. They are for people to have a ‘mindful management’ of attributes, capabilities and enabling skills for employability to stay effective and relevant in every aspect of their lives. They are for people to apply knowledge and skills in an integrated way. They are not specific to particular occupations or industries. The Habits of S.U.C.C.E.S.S encompasses core attributes that will make people more effective thinkers in schools, at home and at work.

These characteristics can be cultivated in almost everyone. It is a set of behaviors that can be taught and modelled. They are traits that can be developed, practiced upon and measured. They transcend age, religion, race, circumstances, language and culture.

Fostering the Habits of S.U.C.C.E.S.S. require active learning strategies in which learners will then take responsibility for their own learning and develop habits of motivated lifelong learners through action learning, situated learning and project-based learning.

Only the wisest and stupidest of man never change. Confucius.
Training the brain to develop the habits of mind requires constant exposure to skillful problem-solving using critical and creative thinking strategies that serve the habits of mind.

This training enables the brain to practice and draw on previous experiences. It is what David Perkins term “experiential and reflective intelligence.”

With a ‘new landscape’ in high performance workplaces, employers will begin to demand that these habits be integrated into the human resource strategies and the overall strategic business development. Consequently, the impact will be felt in the goals of education and teaching with the learning outcomes to be spelt out systematically in lesson plans versus the current practice of being incidental and ad-hoc. Habits of S.U.C.C.E.S.S will support the necessary process of adaptation by business, industry, education and training system to support individuals as lifelong learners to maintain their relevance and employability. This new paradigm will contribute to the building of communities as a competitive learning society attuned to the conditions of the new age.
The habits of S.U.C.C.E.S.S are:

| 1. Suppleness         | • Flexibility in thinking  
|                       | • Creating, Imagining and Innovating  
|                       | • Open to continuous learning  
| 2. Understanding      | • Listening with understanding and empathy  
|                       | • Having a sense of wonderment and awe  
| 3. Constructiveness   | • Using all your senses  
|                       | • Questioning and problem posing  
|                       | • Applying past knowledge  
|                       | • Interdependent thinking  
| 4. Courageous Thinking| • Persisting  
| 5. Exactness          | • Taking responsible risks  
|                       | • Striving for accuracy  
| 6. Self-Management    | • Using precision of language and thought  
|                       | • Metacognition (thinking about thinking)  
| 7. Silliness          | • Managing impulsivity  
|                       | • Finding humor  

Thinking is easy, acting is difficult and to put one's thought into action is the most difficult thing in the world. Goethe
Key Points of Chapter 3

Humour

Silliness

Supple

Flexibility

Creating

Imagining

Innovation

Continuous

Understanding

Listening

Understanding

Empathy

Awe

Wonderment

Using

All

Constructive

Questioning

Problem

Solving

Knowledge

Lateral

Think

Thinking

Courageous

Persistence

Responsible

Risk

Taking

Self-management

Impulsivity

Managing

Meditation

Language

Precise

Henry Tai
Suppleness

The creation of something new is not accomplished by the intellect, but by the play instinct acting from inner necessity. The creative mind plays with the object it loves.

Carl Jung

Imagination is more important than knowledge.

Albert Einstein

Real knowledge is to know the extent of one's ignorance.

Confucius

Thinking flexibly

The wise adapt themselves to circumstances, as water moulds itself to the pitcher.

Chinese Proverb
Suppleness as an attribute in thinking conjures up the image of young shoots, growing and having the quality of adaptability. A young plant has roots, which are fed with rich nutrients, leaves that capture sunlight, and it grows taller every day. Its stature increases each time it engages with its environment. It weathers the elements well and feeds off the energy in the environment. Such suppleness interacts with its surroundings to create fresh adaptations to obstacles, change and new challenges.

Suppleness is made up of 3 strands of the habits of intelligent behaviour;

- Thinking flexibly
- Creating, imagining and innovating and
- Being open to continuous learning

The intelligent person is one who displays suppleness in this thinking process.

Such a person looks at a problem or situation from a multitude of perspectives. He explores all angles and is open to changing his mind when fresh information is discovered or when new and convincing arguments are put forward. Just like muscles need to be exercised and stretched to maintain suppleness and remain useful, the supple thinker exercises his thoughts and stretches them to remain agile to the stresses and strains of an increasingly complex world. We need not look far to appreciate the importance of supple thinking. The recent emergence of SARS (Severe Acute Respiratory Syndrome), the threat of terrorism, the intricate way economies and social influences are inextricably linked across the planet are rich fodder for the supple mind.

The supple thinker is a creative thinker. He can take opposing ideas

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There is nothing training cannot do. Nothing is above its reach. It can turn bad morals to good; it can destroy bad principles and recreate good ones; it can lift men to angelship.

Mark Twain
and create a new thought. He constantly exercises his creativity through imagination, playing scenarios in his mind and creating models to test his ideas.

He is open to continuous learning, because he knows that when his pool of knowledge grows so does his creativity and his store of knowledge and skills, which are required to tackle new problems. He is aware that unless the mind “drinks” fresh thoughts and ideas, the mind’s pool will turn stale and result in stagnation. The supple thinker welcomes differing and sometimes opposing views, because unless he wrestles with these views, he will not be able to sharpen his own.

1a) Thinking Flexibly

Contrary to popular belief, flexible people have the most control. They have the capacity to change their mind as they receive more data. They engage in multiple and simultaneous outcomes and activities. Because they are in control, they are confident in juggling more data and testing different hypotheses to solving problems.

Flexible people can approach a problem from a new angle using a novel approach. Buzan (1974) calls it radiant thinking. Flexible people know that they have and can develop options and alternatives. They understand means-end relationships. They can work within rules, criteria and regulations and they can predict the consequences of flouting them.

Thus flexibility of mind is essential for working with social diversity, enabling an individual to recognize the wholeness and distinctiveness of other people’s ways of experiencing and making meaning. In a world that is increasingly becoming more connected and woven, flexible thinkers can scurry through a thousand possibilities in the

The beautiful thing about learning is that no one can take it away from you.
B.B. King
wink of an eye and sift ideas like sand to identify the gems.

Flexible thinkers are able to shift through multiple perceptual positions at will. One perceptual orientation is what Jean Piaget called egocentrism or perceiving from our own point of view. By contrast, allocentrism is the position in which we perceive through another person’s orientation. Another perceptual position is macrocentrism, or big-picture thinking. This bird’s eye view is useful for discerning themes and patterns from an assortment of information.

Because we often need to solve problems with incomplete information, we need the capacity to perceive general patterns and jump across gaps of incomplete knowledge.

Yet another perceptual orientation is microcentrism, that is, examining the individual and sometimes minute parts that make up the whole. This worm’s-eye view involves logical and analytical computation, searching for causality in methodical steps. It requires attention to detail, precision and orderly progression.

Flexible thinkers display confidence in their intuition. They tolerate confusion and ambiguity.

Taking science as an example, many aspects of science are not in the discovery of new facts, but in discovering new ways of thinking about them.

In particular, with technological advancement, the doors of application of scientific knowledge is thrown wide open. The one who finds the right relationship and leverages bring with it both social as well as economic gains.

Education is not the filing of a pail, but the lighting of a fire. W.B. Yeats
Encouraging flexibility in thinking in the classroom calls for valuing multiple solutions. Allowing the process of problem-solving to keep flowing rather than rewarding the speed at finding a singular solution. The skill of flexible thinking is to be able to hold on to the centrality of the matter on hand and yet probe the farthest reaches of possible solutions. At any point of the process, the flexible thinker can postulate how each scenario will play out when different factors are considered.

One way to achieve this is through the use of Mind Maps®. Flexibility in thinking is a natural way of thinking when thinkers use Mind Maps® to organize their thoughts.

Flexible look at “timely” concepts.

Let us take the example of how we traditionally perceive this. How can we apply flexible thinking to good time management.

**Time Mining**
The concept of time as a fixed resource has severely hampered and discouraged the efforts of man to find more time. If you shift the paradigm to look at time as a resource much like the minerals you find under the earth, you will begin to discover the fascinating idea of time mining.

In a linear time line, time defines a series of events. Time also marks these events so that they can be managed in a logical sequential pattern. However when you look at the events, you see that there are time gaps that can be mined. Take for example the time it takes for a building to be put up. In the old days, you had to build from the ground, putting on one floor at a time. In modern construction, there now exists a way to prefabricate the pieces of walls and even entire floors to accelerate the speed at which the building can

Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of facts. Henry Adams
be completed. In this way, builders have mined for themselves time; time released to construct more buildings. The construction companies who did just that found themselves more time and therefore could generate more economic value.

In another analysis you can find that there are pockets of time you can mine that otherwise would have been wasted. Take for example, the waiting time you spend in the bank, or the airport or on the school bus. If you had planned to do something useful during that anticipated wait time, you have just mined for yourself some time. These time slices, while small, will accumulate into quite a nice block.

Technological changes have allowed us to do things that we could not have done before. Being connected through the cell phone or the email will definitely open more opportunities for us to time mine.

**Time Refining**

Time refining is similar in nature to refining oil. In the refinery, oil is separated into different grades and these grades used for different purposes. You would not want to use an expensive grade of oil for a “cheaper” purpose. By the same concept, there are more valuable times and more suitable times for you to achieve a task. For example, creativity is best when your mind is in an alpha state. Trying to complete creative tasks when you are in a beta state will take more time. Similarly it would be better to accumulate say a 90 minute block of time to ensure that a particular task is completed rather than trying to use small blocks of time to do that task. It will take you maybe twice as long and you may not even achieve the same quality of work.

Being aware of the best time to tackle a task will depend on the

> The wise adapt themselves to circumstances, as water moulds itself to the pitcher.
> Chinese proverb
kind of person and lifestyle you have. For example, some people are more relaxed in the evening and would therefore be better at problem solving then. If you tend to be sleepy in the afternoon, it would be best to schedule errands or tasks that will not demand heavy cognitive processes during that time.

Find ways to doing the task faster will also help to refine time. Looking to use technology and advancement in material sciences will help you to refine time. Getting tips from others on clever ways to get things done will also increase opportunities to refine time.

**Time Storing**

The concept that time cannot be stored has also been a great stumbling block for many. They will simply whittle it away. The idea of storing time is like harnessing the power of the sun. You can capture solar energy in many forms, like heating water or through a solar panel, converting it into electrical energy to be stored for lighting at night.

There are many things in your life that can be “pre-made”. For example if you happen to be in a rush every morning, you can take time in the evening to do the things you need in the morning, like choosing your clothes, packing your lunch or breakfast. Another way to store time would be systems maintenance. For example if you travel frequently, pre-packing of your toiletries, some clothing and ensuring that your passports and other needed documents are always updated will help you to store time.

Creating a positive emotional bank account, doing others a favor when you have the time, so that they can in turn help you when you are busy is another way to store time. Time can be paid forward.

The concept of storing time can also be extended to developing

> The art of life is a constant readjustment to our situation. Kakuzo Okakura
wisdom in what is known as “minute wise – months foolish”. We sometimes deceive ourselves by doing a sloppy job, hoping to get away with it. The truth is that we are victims of our own creation and going back to undo the work or suffering the consequence of the sloppy work will cost us time.

Time for many people is an inflexible element, one of life’s greatest challenges is to think flexibly about time.

Let’s consider how you can use fresh perspectives to “go back” or “push back” the time line in your life.

Others humorous examples of flexible thinking.

As a British Airways plane was getting ready to take off from Johannesburg, South Africa, an elegantly dressed lady, with an air of sophistication, rang for the stewardess. “I object to being seated next to this black man,” she complained. “I demand to be re-seated.”

“Ma’am, I’m sorry, but the plane is full,” the stewardess apologised. “What about business class?” she demanded. “I’ll check,” said the stewardess. Soon she came back. “I’m sorry, Ma’am, the Business Class is also full.”

Success is the ability to go from one failure to another with no loss in enthusiasm. Sir Winston Churchill
“What about the First Class, then?” insisted the lady. The stewardess replied, “Ma’am, I’ll have to speak to the Chief Steward.”

Soon the Chief Steward came, and said “I am sorry to hear that you do not wish to be seated next to this gentleman. I’m happy to inform you that we do have one empty seat in the First Class section and we will be able to take care of your problem. Then turning to the man he said “Sir, if you will please follow me, we have a seat waiting for you.”

This story illustrates how flexible thinking can be applied to problem solving.

A young man was on duty at a grocery store. A lady walked in and wanted to buy half a cucumber. He said “I am sorry, we only sell whole cucumbers.”

But the lady persisted, “I only need half a cucumber, why don’t you ask your manager about it?”

The young man relented and walked to his manager’s room and said “There’s an idiot out there who wants to buy half a cucumber!” He did not realize that the lady followed him into the office, as he turned and saw her, he nonchalantly continued “Oh and this lady wants to buy the other half.

This story illustrates the quick wittedness of the young man in being very flexible in his thinking to get him out of an
A businessman moved into a new shopping center and set up a clothing store. A few months later, he found himself sandwiched between two stores, also selling clothes. The store on his left put up a sign saying, “Lowest Prices!” The store on the right had a large sign saying “Widest selection in town.” The businessman realized that he could not compete with them. He finally put up a sign in front of his store saying “Main Entrance.”

While this is only a joke, the clever businessman had practised the habit of flexible thinking.

1b) Creating, Imagining and Innovating

All human beings have the capacity to generate novel, clever or ingenious products, solutions and techniques - but that capacity has to be developed. Creative human beings try to perceive problems and solutions differently, examining alternative possibilities from many angles. They tend to project themselves into different roles using analogies, starting with a vision and working backwards and imagining they are the objects being considered.

Creative people take risks and frequently push the boundaries of their perceived limitations. Creative people are open to criticism. They hold up their products for others to judge and they seek feedback in an ever-increasing effort to refine their technique.

The bamboo that bends is stronger than the oak that resists. Japanese proverb

Answer to teaser: Professor is a woman
Creativity, innovation and imagination can be cultivated in the field of cross-domain application, for example, finding associated applications between Science and Art, Mathematics and Music, Dance and Physics, Painting and Mathematics, Sculpting and English. Even if the subjects cannot be taught in such a manner, we should encourage and create opportunities to link the domains by making references to past lessons, or events and find links between them.

In each of the major subjects such as Mathematics, Science and English, the aesthetic aspects can be taught from time to time. For example, writing poetry is both an art form as well as a language subject. Mathematics can be used to create balanced sculpture. Science today is used to enhance the culinary experience. Scientific knowledge can be used to grow crystals to create 3-D art objects. History can be told through a play, celebrating both the collective memories of the human race and human expressions through body language and verbal language. Geography can create majestic art pieces. Literature can be converted into a ballad, together with musical scores.

Innovation is the selection, development and implementation of creative ideas. Innovative thinking requires both critical as well as creative thinking elements. A person who does not think critically tends to accept or reject information or ideas without examining them. In a world where ideas abound, this is dangerous. Take the internet for example where much information is inaccurate and not validated. In a world where the ability to source and assess ideas on an ongoing basis as part of our work and life, critical thinking is as essential as being able to read, write and count.

Creativity, the big C's and small c's

"It takes courage to be creative. Just as soon as you have a new idea, you are a minority of one." ~ E. Paul Torrence
Creativity is all around us. However we are conditioned to think that unless we have developed earth-shaking, mind-boggling CREATIVE ideas, we are not creative. We retreat into a humility shell and say, we are not that creative and so we rob ourselves of the pleasure of celebrating creative episodes in our lives.

The BIG time, earth-shaking creativity comes once in a while and is few and far between. We can call this the BIG “C” creativity. We gawk and stare at such lofty breakthroughs and concepts and marvel at the feat. Much as BIG “C” creativity is worthy of such spectacle, we should bring out the small glasses and clink our toast to our daily small ‘c” creativity and give ourselves a small pat on our back for practising creative problem solving or idea and problem finding. This is the beginning of living a creative life and of becoming aware of our creative abilities.

There are conditions that help to foster creativity in our lives.

As a start, we should go back to our brains, the organ that is responsible for creative functions. Research indicates that it is in the alpha (and sometimes theta) state that we are most creative.

When you are making a presentation or deep

<table>
<thead>
<tr>
<th>Brain States and its related functions</th>
</tr>
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<tbody>
<tr>
<td><strong>Beta:</strong> Alertness, Concentration, Cognition</td>
</tr>
<tr>
<td><strong>Alpha:</strong> Relaxation, Visualization, Creativity</td>
</tr>
<tr>
<td><strong>Theta:</strong> Meditation, Intuition, Memory</td>
</tr>
<tr>
<td><strong>Delta:</strong> Detached Awareness, Healing, Sleep</td>
</tr>
</tbody>
</table>

To live a creative life, we must lose our fear of being wrong. Joseph Chilton Pearce
in the midst of a crisis, you are probably in Beta mode and therefore not in the best state to come up with creative solutions. For some people, in a prolonged Beta state, they go into spates of alpha states and they get the “Aha” moment when pieces of the “jigsaw” come together to provide a uniquely brilliant and creative solution. Creativity requires a whole-brain approach (Buzan). Contrary to popular belief, creative individuals are not just right-brained people. They habitually use both sides of their brains. Returning to our understanding of brain functions, when a person is adept at both right and left brain skills, their thinking becomes more creative.

Tapping into the flow experience

Mihaly Csikszent Mihali is the author of “flow” and the Professor of Psychology and Management at Clevemont Graduate University. Mihaly’s studies into the optimum human performance revealed that the brain produces the best work at a state of mind which he termed “flow”.

Flow is defined as the experience of a person when he is totally focused and absorbed in the task such that the person and the task become inextricably fused with each other. The mind then takes on a magical world of its own and all other dimensions like time, hunger, pain and the immediate surrounding become irrelevant and unimportant.

Mihaly says that even with the most optimal environment, flow can only be experienced a few times a day and usually last about 1 to 2 hours at a time.

The revealing fact is then that creativity needs TIME. We cannot

Imagination is more important than knowledge. A lbert E instein
force and dictate a person to perform creative work in a short time.

Creativity cannot be based on NOTHING. It has to be based on information, facts and understanding that are already stored in the brain. That is why there is a strong correlation between memory and creativity. Buzan believes that the key to good memory is a strong sense of imagination and association. This is also the same key to creativity. Therefore, the more you exercise your memory through the use of this key, the more creative you become as well. As you gather information over time, you have a larger storehouse to create more imagination and association. So contrary to the belief that your memory deteriorates as you age, you actually have more arsenal to develop a stronger memory.

The early artists drew their creativity from nature. Today, there are more forms of art to choose from and some, like Andy Warhol, drew his creativity from looking at basic household items from a different angle.

The creative person does not have more facts or time, he does however look at and processes information differently. The creative person:
• Is willing to take risks
• Has a broad range of interests
• Questions frequently
• Is curious and inquisitive
• Can combine ideas from different domains
• Is not afraid to deviate from popular thinking
• Is playful
• Displays fluency of ideas
• Tolerates ambiguity
• Is open to continuous learning
• Engages in problem-finding

Mickey Mouse popped out of my mind onto a drawing pad on a train ride.. at a time when business fortunes of my brother Roy and I were at their lowest... Walt Disney
The last point warrants some elaboration. Many of the BIG “C” creativity comes from “problem-finding” as opposed to problem solving.

The story of Post It® and Velcro® illustrates this. ‘Post-it’ is one of 3M’s famous products. The basic ingredient, the glue, was invented by Dr. Spence Silver, who actually created it unwittingly. It was an adhesive that formed itself into tiny spheres with a diameter of a paper fibre.

As the spheres would only make intermittent contact they did not stick very strongly when coated onto paper backing. Did you know that 3M research scientist Dr. Spence Silver took 5 years of hawking the product within 3M before he met then new-product manager Art Fry.

Art Fry was frustrated at how his scrap paper bookmarks kept falling out of his church choir hymnal. In a moment of “Eureka”, he found a great innovative use of Dr. Spencer’s strange glue as a way to make reliable bookmarks. The Post-it was born. In this story of creativity and innovation, Spence created a new type of glue, but it took 5 years before some one else (Art) found an innovative way to use it.

At the turn of the 20th century, George de Mestral was a boy living in Switzerland. He loved the outdoors and he also loved inventing.

George received his first patent at 12 years of age for designing a toy plane. As George grew up, he was often in the woods, hunting and walking through bushes and forest areas. He would be annoyed by the burrs that stuck to his pants and his dog’s fur. He wondered why the burrs stuck so well. By examining the burrs

“The central task of education is to implant a will and facility for learning; it should produce not learned but learning people. The truly human society is a learning society, where grandparents, parents, and children are student together.” – Eric Hoffer
under the microscope, he discovered that the burrs had hundreds of tiny hooks that grabbed into loops of thread or fur. George worked on the idea that the concept of the burrs could be used. He talked to fabric and cloth experts and worked with different types of woven and knit cloth. In 1952 George started a company named Velcro (Velcro comes from the root French words for velvet and hook) In this story, George was inquisitive enough to find out why the burrs stuck to his clothes. After discovering the principal of how burrs works, which had been there since creation, George took the idea to create what we know now as Velcro. George innovated nature’s gift of the burrs into a product.

A lady driver rammed her car into another car. The other driver got out and surveyed the damage. It was very bad. He called the police on his mobile phone. The lady went to the trunk and pulled out a bottle of wine and two glasses. “Thank God,” she said, “they are not broken.” Then she suggested, “Well, it may be a while before the police come. Why don’t we celebrate that we were not hurt in this accident?” The man thought it was a good idea, and the lady poured him a glass of wine. He drank it, “My, that is good wine,” he said. The lady poured him another and another. “Why are you not drinking?” the man asked. “Because,” pointing to the approaching police car, “I won’t have to explain to the police why I was driving when I am drunk.”

While the lady in this story is rather deceitful, it however illustrates the way she uses the wine in her car, some imagination and creative thinking to stage an event to get her out of trouble.

An old lady came regularly to a bank to deposit money. The bank manager became curious. “You have been depositing
sums of money at our bank, I wonder what you do for a living?"
“Well I do a bit of betting on the side.” The old lady replied.
“Like on horses?” the manager asked
“Oh not that kind,” the lady replied
“What kind then?” the curious manager persisted.
“For example, I bet you $500 that you will be wearing pink underwear this time next week.”

The manager was shocked at the lady’s suggestion. How can she control what I wear, he asked himself. “O.K. lady, I’ll take up your bet” thinking for sure he would win. “This time, you’re sure to lose” he told the lady. “We’ll see”. The old lady smiled and went on her way. A week later, the lady showed up at the manager’s office. She had brought along a young man as witness. “Well, I have come to collect my bet,” said the lady. The manager replied, “I think it will be you who will be paying me the $500.” “O.K., then show me,” said the lady. The manager promptly pulled his pants down to reveal the colour of his underwear, which was obviously not pink. Upon that the lady turned to the young man and said, “Give him the $500 and give me the other $500.” The manager was confused, “What’s going on?” he asked. “You see,” said the lady, “I bet with this young man $1000 that I could walk into your office and make you take your pants off.”

A businessman walked into a bank in New York and asked for a loan of $5000. He was going on a business trip to London.
“Do you have an account with us?” asked the manager.
“No,” replied the businessman, “but I have a brand new Rolls Royce parked outside. You can keep it as collateral.” The manager went outside to examine the car and had his assistant make a quick check on the registration and found that it was indeed

Those who know how to think need no teachers. Mahatma Gandhi
registered to the businessman.

“OK sir,” he said, “we’ll give you the loan.” Two weeks later the businessman returned to the bank. “How much to pay down the loan?” “Oh not much,” the manager said, “just $50 dollars for the interest and $5000 for the principal”.

The businessman promptly repaid the loan and was on his way out to pick up his car. “Just a minute sir,” the manager said, “while you were away, I did more checks and realized that you are a man of exceptional wealth. Why did you need the $5000 loan?” “Well, I was driving my brand new Rolls Royce to the airport and I was thinking, where should I park this very expensive car for two weeks, have it guarded well for only a little money.”

1c) Remaining Open to Continuous Learning

“The future belongs to countries whose people make the most productive use of information, knowledge and technology. These are the key factors for economic success, not natural resources” (Mr. Goh Chok Tong, then Prime Minister of Singapore 1993 National Day Message). Singapore’s response to the emerging knowledge economy, massive information explosion and rapid knowledge obsolescence is to be a learning nation.

Life-long learning requires us to provide freedom, opportunity and resources for self-learners of all ages, to choose what they want to learn and to constantly reinvent themselves to stay supple and relevant.

Intelligent people are in a continuous learning mode. Their confidence in combination with their inquisitiveness, allows them to constantly search for new and better ways to improve their learning.

A teacher affects eternity, he can never tell where his influence stops. Henry Brooks Adams
People with this habit of mind are always striving for improvement, growing, learning and modifying and improving themselves.

In the New England Centenarian Study, one of the participants, Harry Shapiro said in his interview that he was learning new skills right up to 100 years of age. Dr. Margery Silver found that his cognitive skills at 100 years of age surpassed the average person half his age. Mr. Shapiro happened to be someone who loved to learn. Dr. Silver believed that the mind is like a muscle and the more it learns, the better it becomes, regardless of age.

One key obstacle in remaining open to continuous learning is the dislike for learning. Most people have had a “bad” experience with learning; predominantly that experience is what they had in school. To many people, learning means many hours of hard work memorizing text and facts, long tedious hours of writing assignments and boring lectures to top it off.

This unfortunate but real experience of learning stems from a basic error in the way teaching and learning was happening in our schools.

Many students were never taught how to learn, before they began to learn (Buzan). It is analogous to throwing someone off the boat to explore the ocean, but forgetting to teach them how to swim first.

In a world that is generating more knowledge and information than any single human being can ever learn, we must imbue students with the habit of looking for, sieving through and digesting relevance from this new knowledge. Much akin to teaching someone how to fish or hunt, we must teach students how to look for good tasting morsels of knowledge, then how to trap them and consume them to sustain them in this world.

A little learning, indeed, may be a dangerous thing, but the want of learning is a calamity to any people. Frederick Douglass
The basic learning skills should include:
• Knowing how memory works and ways to improve it
• Knowing how retention and understanding of facts takes place in our brain and how to create the optimum environment for it.
• Speed and range reading
• Mind Mapping
• Creative thinking
• Critical thinking
• Research skills

Methods of research should be taught. Tools for verifying and testing information should be taught. A desire to know more and a sense that we do not know everything must be inculcated in each student before they leave the safety of the school zone.

Above all learning should be fun!

Few people would know that the popular game “Where are you Carmen Santiago?” was originally developed as a game to teach staff at Sabena airlines lessons on customer service and tracking of luggage.

Games offer a wonderful way to teach. Today, there is a great mental divide between games and education, however there is a revolutionary breakthrough waiting for those who can bridge that divide.

A wife said to her husband, “You pay more attention to the newspaper every morning than you do to me. I wish I was that newspaper you have in your hands.” “Yes, but don’t forget: I get a new edition every morning” the husband replied.

The story while having a sarcastic side to it, also illustrates the need...
to obtain new information every morning.

A mother mouse took her babies for a walk. As they came around a corner, the came face to face with a cat. The little mice were terrified and scurried behind the mother. The mother mouse looked the cat in the eye and said “Woof woof.” The cat turned around and ran away. The mother mouse then turned around to her children and said, “See I told you it pays to learn another language.”

A budding preacher wanted to learn to preach. He was told that a guest speaker was in town speaking at a church. This speaker was known to be able to grab his audience’s attention with his opening sentence. The preacher went to listen to him.

The speaker began, “Last night, I was in the arms of a woman, and she was not my wife.” The congregation gasped in horror. “She is my mother.” The speaker went on “tonight I will speak on the love of a mother which is a reflection of God’s love.”

The preacher was impressed and decided to use the same opening lines on Sunday. He went up to the pulpit and was a little nervous, but he began “Last night I was in the arms of a woman and she was not my wife.” The congregation was shocked and a commotion broke out. The preacher lost his train of thought, stammered and said “And oh dear, I have forgotten who she was!”

Learn well!

For every student with a spark of brilliance, there are about ten with ignition trouble. Milton Berle
A author’s comment: Therefore teach them how to be brilliant!
**OPEN TO CONTINUOUS LEARNING**

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 1 | 29 | 4 | 19 | 7 | 10 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

K I E N

C N I N

I N C E M E N

1 M E M E N

1 4 7 11 3 21 2 23 7 23 10 5
THINKING FLEXIBLY

Across
3. The art of coming up with many ideas
5. The brain is well know for its ________

Down
1. The colours of a chameleon is
2. It means various possible solutions
4. Mary is as ________ as water is ________
to the shape of its container
CREATING, IMAGINING AND INNOVATING

ARTISTIC
INGENIOUS
UNIQUE
CLEVER
NEW
FRESH
NOVEL
When people talk, listen completely. Most people never listen.

Ernest Hemmingway

Gathering data through all senses

Wisdom begins in wonder.

Socrates

There are only two ways to live out your life. One is as though nothing is a miracle. The other is as though everything is a miracle.

Albert Einstein
The Habit of understanding is made up of 3 strands:

- Listening with understanding
- Sense of awe and wonderment
- Gathering data from all senses

Intelligent thinkers display understanding in many aspects of life. They gather data from all senses, relying on the combined input, associating and relating each piece of data to another. They look for patterns and know when to use guiding thought patterns and when to “switch it off”.

Intelligent thinkers look to understand people beyond mere words. Listening for understanding from the speaker's point of view, they suspend judgment momentarily enabling their minds to see the information through clearer lenses.

Thinkers who exhibit the habit of understanding make less assumptions and if they do, are cognizant of the assumptions they have made. They develop a child-like fascination for facts and information and often exhibit a sense of wonderment and awe. In their quest to understand the world in and around them, they use all their five senses to explore and experiment.

2a) Listening with Understanding and Empathy

Steven Covey, author of “The Seven Habits” said “highly effective people spend an inordinate amount of time and energy listening”. Some psychologists believe that the ability to listen to another person, to empathize with and to understand that person’s point of view, is one of the highest forms of intelligent behaviour. The ability to paraphrase another person’s ideas, detect indicators of feelings or emotional states in oral and body language and

Never mistake knowledge for wisdom. One helps you make a living, the other helps you make a life. Sandara Carey
accurately express another person’s concepts, emotions and problems, are all indicators of listening behavior.

People who demonstrate this habit of mind are able to enrich their thinking though seeing things from the diverse perspectives of others.

Peter Senge, author of the “Fifth Discipline” and his colleagues suggest that to listen fully means to pay close attention to what is being said beneath the words. You listen not only to the “music” but also to the essence of the person speaking.

Ears operate at the speed of sound but the eyes operate at the speed of light, so it is important to also “listen” and perceive the visual indicators as well as what is being said.

We spend 55% of our lives listening, but perhaps listening is the least taught skill in school (Costa).

More than 55% of communication is delivered through non-verbal cues like facial expression, body stance and hand gestures. Yet we sometimes listen without looking at the person, and we lose more than half of the communication channels.

We often say we are listening, but we are actually more occupied with what we have to say than what we are listening to. Some people ridicule, laugh at or put down another’s idea. They interrupt, and are then unable to build upon another’s ideas.

We need to learn to hold our own values, judgment and opinions while listening to another person’s thoughts.

Good listeners may disagree with the other person, but they know

Language shapes the way we think and determines what we can think about. Benjamin Lee Whorf
exactly the nature of the disagreement.

Listening with understanding

A good way to listen is to use the three “P’s; Pause, Paraphrase and Probe (Costa).

When you pause to listen, you allow yourself to integrate the information, feelings and context of what the speaker is saying.

Paraphrasing what the speaker has just said allows you to confirm the facts and also informs the speaker that you have indeed been paying attention to him.

Probing allows you to ask pertinent questions to “fill in” the missing jigsaw pieces to allow you to see the whole picture, or to make sense of the story in your mind.

Practice listening to and paraphrasing the words of the speaker before answering or probing further.

The Chinese character for listen, is rich in the meaning and art of listening.

Often highly successful new products do not necessarily represent a new breakthrough in technology, but just a more creative and innovative application of existing know-how.

Yeo Cheow Tong, former Singapore Trade and Industry Minister
A man wanted to run for office of mayor. He was told that to get votes, he needed to go out to the villages where most people lived. So he went out to a remote village. The village chief gathered all the people to hear him.

“If you elect me as mayor, I will dig a well for every family.”

The people looked at him and said, “Oom-pah-pah-pah.”

Not knowing what that meant, he continued, “And if you elect me, I will bring electricity to every home.” The people looked at him again and said, “Oom-pah-pah.”

“And if you elect me, I will build for you a school, a clinic and a football field.”

The people again said, “Oom-pah-pah, Oom-pah-pah”

After the rousing speech and the enthusiastic response, the man felt very good, and decided to call it a day. The chief invited him to his house for a drink. As they walked towards the chief’s house, they passed some cows standing around. The chief said to the man, “Be careful not to step on the “Oom-pah-pah.”

This story illustrates that sometimes we do not reflect on what people are really saying to us because we are so full of ourselves. We tend to hear what we want to hear. Listening with understanding also requires us to “reflect” and “peel away” the layers to get to the truth of what others are saying to us.

Education would be much more effective if its purpose was to ensure that by the time they leave school, every boy and girl should know how much they do not know, and imbued with a lifelong desire to know it. Sir William Haley
A farmer went to see a lawyer about divorcing his wife.

“Do you have any grounds?” the lawyer asked.
“Of course, I have 100 acres of ground.”
“No what I mean is, do you have a case?” replied the lawyer.
“Of course I have a case. It’s where I keep all my important documents.”
“No what I mean is do you have a suit?” the lawyer in exasperation replied.
“Yes, that’s what I wear to church every Sunday.”
“Okay, do you have a grudge?”
“Yes I do and that’s where I park my tractor!” said the farmer.
“All right, let me put it this way, why do you want to divorce your wife?” the lawyer asked, almost in tears by this time.
“Well, I could never have a meaningful conversation with her.” stated the farmer.

This joke is about misunderstanding - the nemesis of listening with understanding.

A young man was studying in college and having some financial problems, he decided to call his Dad long-distance. He had to connect through an operator to reverse the charge to his Dad.
“I need to borrow some money Dad.,” said the son. At the other end of the line the father said, “sorry I can’t hear you very well. The line may be bad.”
The son said, “I need to borrow five hundred dollars Dad.” “Sorry can’t seem to understand what you are saying,” the father bellowed. “Five hundred dollars, I need five hundred dollars!!” “Still can’t make out what you’re saying son.,” the father replied.

Learning is like rowing upstream, not to advance is to drop back. Chinese proverb
At this stage the operator chipped in and said, “Sorry to eavesdrop, but your son is saying he needs five hundred dollars.” The father replied, “Oh good, since you can hear him perfectly, you send him the money.”

Obviously the father was practicing listening “selectively” instead of listening with understanding.

Three women were walking up a hill.
“Windy isn’t it?” one women quipped
“No I think its Thursday,” another replied
“So am I, lets go for a drink,” replied the third.

This is a case of listening with mis-undersstanding!

2b) Gathering Data Through All Senses

The brain is the ultimate ‘reductionist’. It reduces the world to its elementary parts: photons of light, molecules of...
smell, sound waves, vibrations of touch, all of which send electrochemical signals to individual brain cells and store information about lines, movements, colours, smells and other sensory inputs.

Intelligent people know that all information gets into the brain through sensory pathways, gustatory, olfactory, tactile, kinesthetic, auditory and visual. Keeping the channels of information well “tuned” is simply using them well.

A great exercise in gathering data through all senses is cooking or baking where you knead the dough, feel the consistency, beat the eggs smell the ingredients, look at the colours and appearance of the ingredients, calculate, estimate and taste the outcome of your work. It is truly a spa for the senses.

In detective stories, great detectives like Sherlock Holmes use all their senses to solve crimes. The television series, CSI, is a great model of how detectives use their sense of touch, smell, taste and hearing both at the crime scene and the laboratory to gain insights and eventually solve complex crimes.

There is an amusing story about a professor from the medical faculty of a well-respected university who was known to trick his students into tasting their own urine.

At the first lesson, he will ask the freshman to follow him in a medical procedure.

First he would urinate into a glass beaker, then he would stick his finger into the beaker to soak it with the urine, and then he would proceed to lick his finger.

What he did not tell his students is that he only made it look like he

Real knowledge is to know the extent of one's ignorance. Confucius
was licking his finger. His tongue did not actually touch his fingertip. Students who were observant discovered that and did not taste their own urine, but those who did not exercise full observation skills actually did.

The lesson was powerful. Observe with all senses!

An elderly man and his wife walked into McDonalds and ordered one hamburger, one portion of French fries and a Coke. They sat down. He carefully cut the hamburger into two and gave one to his wife. He then carefully counted the fries, divided them into two equal portions and gave one portion to his wife.

A young man saw him doing this and came over. “Sir,” he said, “could I buy you and your wife another hamburger and fries?”

“Thank you very much, young man,” the elderly man replied, “but you see, my wife and I have been married for fifty years, and we share everything.”

The young man returned to his seat, while the elderly man proceeded to eat his half of the hamburger. His wife sat watching him. The young man could not bear it any longer, so he got up and went to the couple and said, “Sir, I would really like to buy you another hamburger and fries.”

“Thank you very much, young man,” the elderly man replied, “but you see, my wife and I have been married for fifty years and we share everything.”

The young man sat down and now he saw the wife eating the fries while the elderly man just sat and watch.
The young man could not take it any longer and went over to them and said, I really feel bad watching you and your wife, you allow me to buy you more food.”

The elderly man said, “We share everything.” “Yes I have heard that,” the young man said, “but why do you take turns to eat? What are you waiting for?”

The elderly man said, “We share everything, we were waiting for our teeth.”

While this is a hilarious story, the point is that if the young man had been observant, he would have noticed that they had exchanged teeth just before waiting for each other.

In the great movie director, Steven Spielberg’s works, the light source conceals mystery, whereas for many other directors it is darkness that conceals mystery. The difference is that for Spielberg, mystery offers promise instead of threat - he apparently developed that orientation when he was growing up in Phoenix, Ariz. One day we sat and talked about his childhood, and he told me of a formative experience. “My dad took me out to see a meteor shower when I was a little kid,” he said, “and it was scary for me because he woke me up in the middle of the night. My heart was beating; I didn't know what he wanted to do. He wouldn't tell me, and he put me in the car and we went off, and I saw all these people lying on blankets, looking up at the sky. And my dad spread out a blanket. We lay down and looked at the sky, and I saw for the first time all these meteors. What scared me was being awakened in the middle of the night and taken somewhere without being told where. But what didn’t scare me, but was very soothing, was watching this cosmic meteor shower. And I think from that moment on, I never looked at the sky and thought it was a bad place.”

There are two important elements there: the sense of wonder and hope, and the identification with a child’s point of view. Spielberg’s best characters are like elaborations of the heroes from old ‘Boy’s Life’ serials, plucky kids who aren’t afraid to get in over their head. Even the character Oskar Schindler has something of that in his makeup--

A man was concerned with his wife’s hearing, so he consulted a doctor. “It’s getting really bad,” he said. “How bad?” asked the doctor. “I don’t know,” the man said. So the doctor suggested the following, “When you get home, call her from the front door. Then go to the room where she is and call to her from the outside the room. Finally, go up to her and

It takes humility to seek feedback. It takes wisdom to understand it, analyse it and appropriately act on it. Stephen Covey
speak to her up close. That way we will know how bad her hearing is.” So when the man got home he called her from the front door, “Darling is dinner ready?” He heard nothing. So he went up to the room where she was and said, “Darling, is dinner ready?” still nothing.

Finally he went up to her and spoke into her ears, “Darling, is dinner ready?”

The wife looked at him and said, “For the third time, yes!”

This story has a twist – we keep thinking the problem is with the wife. Sometimes in order to listen, we must first assume the problem could be with us!

A customer entered a restaurant and sat down to order his food. After ordering, he signaled the waiter and said, “Could you turn up the air-conditioning, it’s very warm in here.” “Certainly sir,” replied the waiter.

As the food was brought to him, the customer said to the waiter, “Could you turn down the air-conditioning, I don’t want the food to get cold too quickly.”

“Sure,” said the waiter.

In the middle of his meal, the customer again called the waiter and said, “Could you turn the air-conditioning up, it’s getting warm again.” “Not a problem sir,” said the waiter courteously.

Another customer saw what was happening and called the waiter over to praise him, “I am amazed at your patience with the other

Listening is perhaps the most important skill that many lack, few teach and is never found in a school curriculum.
customer." “Oh, it is not a problem sir, you see, we don’t have any air-conditioning at this restaurant.”

2c) Responding with Wonderment and Awe

The seed of great thought usually starts with a sense of wonderment. In the minds of great discoverers, inventors and philosophers, the thought-processing language most probably has the following prefix “What will happen if I make this radio so small that it can be carried in the pocket?”

A response of awe and wonderment is a manifestation of a soul filled with the passion for living. It is a life without fetters, unrestrained by fears and rules, unencumbered by circumstances, free from prejudices and emotional baggage from the past, not imprisoned by past mistakes. It is a child-like sense of excitement. It is a “wildness” of mind - one where the world is a place full of hidden greatness waiting to be found and enjoyed!

**Practical activities to promote using all your senses**

Take nature walks and
- Smell the forest.
- Touch the leaves and vines and twigs.
- Feel the air. How sweet it is in the morning and heavy it is in the afternoon.
- Look at the little creatures and observe their movements.
- Taste the wild fruits (check if they are edible first!)
- Hear the sounds of the forest.

**Cook**

Make observation your daily activity.

Responding with awe and wonderment

крыл The secret of success is constancy to purpose. Benjamin Disraeli
• Finding wonderment in the world around us begins with a mind that wants to know how everything works.
• Watching Discovery Channel or Animal Planet helps to fuel that mind-set
• Reading about the weird and wonderful things around us stokes the appetite for more wonderment and awe.

Sherlock Holmes and his trusted companion Watson went on a camping trip. Out in the open field, they pitched a tent and soon fell soundly asleep. In the dead of the night, Holmes, woke up and felt something awry. He woke Watson and asked him, “Watson! look up and tell me what you see?” Watson replied, “I see millions of stars.” “What does that tell you?” asked Holmes. Watson pondered for a moment and said, “Astronomically speaking, it tells me that there are millions and millions of galaxies and we are just but one speck of it. It really is quite awesome.” Holmes stared at Watson and said, “You fool, it means that someone has stolen our tent!”

This joke illustrates that we can be awe-struck and forget ourselves. If you practice the habit of responding in awe, you will often be excited about the world around you.

The Pope was visiting New York. As he had some time in between his busy schedule he asked his chauffer to take him out on a private sightseeing tour incognito. The Pope had always wanted to drive through the streets of New York so he asked his driver to let him take the wheel and the driver sat in the back seat. The Pope enjoyed his drive so much he was not watching the speed limit and was soon stopped by a traffic cop. As the traffic cop approached the

You cannot teach a man anything, you can only help him find it within himself. Galileo
car, the Pope wound down the window. When he recognised the Pope he went into a state of shock. He did not know what to do so he radioed his superior and said “Sir, I have a problem.” The superior asked, “What is it?” The cop said, “I have just pulled over somebody really important.” The superior asked, “Who is it?” The cop said, “I really don’t know, but the Pope is his driver!!”

The cop was in awe of such a sight – the Pope being the driver!

When a teacher calls a boy by his entire name, it means trouble. Mark Twain
LISTENING WITH UNDERSTANDING AND EMPATHY

Across
1. The action of paying attention
3. Attitude showing that you honor someone

Down
1. Connecting with another person
2. Putting oneself in someone’s shoes
4. Looking after a person sincerely
GATHERING DATA THROUGH ALL SENSES

**Across**
2. This machine is very _____ as it can detect very small changes.
5. Did you _____ what I just said
6. The same when you use your nose

**Down**
1. To engage back and forth with a machine or someone
3. The sense of feeling when you use the hand
4. To be fully involved in an activity
RESPONDING WITH AWE AND WONDERM ENT

Across
2. The word you utter when you suddenly “got it”
5. A state of mind when you are anticipating something new

Down
1. Totally interested and absorbed with something
3. When Johnny entered Disneyland, he immediately thought it was a ______
4. The comic publisher of Spiderman
Key Points of Chapter 5

- Listening
  - Understanding
  - Empathy
  - Communication (55% non-verbal)
  - Skill: Paraphrase
  - Indicators: Feelings, emotions, concepts, problems

- Observations
  - Mysterious
  - Excitement
  - Tyranny

- Senses
  - Pathways: Learning
  - Types: Gustatory, Visual, Auditory, olfactory, tactile

- Awe, Wonderment, Responding

Handwritten: Henry - 1/1
Constructiveness
The Habit of constructive thinking is made up of 3 strands;

- Thinking interdependently
- Questioning and problem posing
- Applying past knowledge

Constructive thinkers build their new knowledge on past knowledge, making associations and applications as they do so.

They are adept at working with others. They have honed their skills in drawing upon the strength of team members and developing cohesive inspiring working relationships with team members. These thinkers value the thinking of others, they are unafraid of opposing views, enjoy good constructive debates as a way to polish their own thinking and probe weaknesses in their own thinking processes.

Constructive thinkers ask good questions. Their habit of questioning leads them to test systems and long-held assumptions and play with scenarios. Their ability to question and pose problems without malice helps them to constantly construct better products, solutions and services.

3a) Thinking Interdependently

Humans are social beings. We congregate in groups, find it therapeutic to be listened to, draw energy from one another, and seek reciprocity. In groups we contribute our time and energy to tasks that we would quickly tire of when working alone. We are such social creatures that solitary confinement is one of the cruelest forms of punishment that can be inflicted on an individual.

Working in groups requires the ability to justify ideas and to test

> My goal is simple. It is a complete understanding of the universe, why it is as it is and why it exists at all. Stephen Hawking
the feasibility of solutions strategies on others. It also requires developing a willingness and openness to accept feedback from a critical friend.

As the world grows in increasing connectedness and complexity, the ability to think interdependently has become ever more so important. Leadership in the 21st century has shifted from being able to provide solutions to your followers to being able to mine the collective minds of your followers for solutions.

The great artist and inventor, Leonardo Da Vinci often consorted with great minds of his time. He viewed the works and ideas of others as “experience by proxy”. Reading the thinking of great men, either past or present is a habit of the interdependent thinker. Leonardo Da Vinci also pointed out that the works of others should be studied carefully and critically and ultimately be tested through our own experience. This is one way of traversing time and space in interdependent thinking.

At the fiftieth anniversary of the publication of the scientific discovery of the double helix structure of DNA by Watson and Crick, James Watson elaborated on several reasons for their success;

• They were passionate about their work.

• They were willing to try approaches that came from outside of their area of familiarity then Watson let in on a stunning reason;

• They were not the most intelligent of the scientists in the pursuit of the DNA structure.

Watson revealed that he believed the smartest person of the lot was Rosalind Franklin, a British scientist working in Paris at that time.
Waston said “Rosalind was so intelligent that she rarely sought advice. If you’re the brightest person in the room, you’re in trouble.”

Group consultation has long been recognized to produce superior decisions than lone decision-making.

Psychologist Patrick Laughlin of the University of Illinois, discovered that the approaches and outcomes of cooperating groups are not just better than those of the average group member, but are better than even the group’s best problem-solver functioning alone.

How then do we cultivate the habit of thinking interdependently.

The key attributes to thinking interdependently include;
• The ability to withhold judgment as you listen to others.
• Knowing how to value the contribution of others
• Inspiring a common vision and focus in eliciting participation
• Ability to communicate clearly
• Knowing others

Let us look at each one in detail;

Withholding judgment
Interdependent thinkers sift through the emotional clutter to listen to ideas and views. Like panning for gold, it takes patience and a keen focus to cast out the debris and often nuggets of gold can be found. Various tools are available such as the MIDAS1, the MBTI2 or DISC3 to help build a team whose members think rather differently or who have different dispositions.

1 MIDAS, short for Multiple Intelligences Developmental Assessment Scales was developed by Dr Branton Shearer. This tool provides the multiple intelligence profile of an individual.
2 MBTI is the acronym for Myers-Briggs Type Indicator. A psychometric test to assess personality type.
3 DISC is a personal assessment tool based on the work of William Moulton Maiston.

When you know a thing, to recognize that you know it, and when you do not know a thing to recognize that you do not know it. That is knowledge. Confucius
These teams are often found to produce higher quality decisions compared to teams whose members think alike.

Valuing contributions
Human beings by and large are endowed with the ability to sense if their ideas are acceptable, or if the listener is just patronising them. There is no short cut to valuing contributions - only sincerity counts. Let the contributing person know if you have taken his views into account. Sometimes not all views can be used and it is all right to say that. If you end up not using any of the person’s ideas any of the time, maybe it is an indication that perhaps you should start talking to someone else.

Inspiring a common focus
Drawing ideas and views can be made more powerful if the central idea and mission can be communicated clearly and with enthusiasm. Usually a weak non-effusive communication gets you a weak, non-effusive response. Allowing others to see how important the decision or solution can be in the entire scheme of things helps to give a bird’s eye view of the magnitude of the matter at hand. Mind Mapping (see chapter 12) is a wonderful tool for creating a mental image for team members to focus their thoughts on. It also allows each member’s thoughts to be placed without interfering with other team members’ ideas.

Knowing others
Next to knowing yourself, knowing others makes a great difference in interdependent thinking. Knowing the person’s family background, previous accomplishments, dreams, desires and technical competencies are all valuable information for you. In this respect the tools mentioned earlier such as MIDAS, MBTI and DISC are useful.

If you think education is expensive, try ignorance. Derek Bok
A man went into a bar and ordered three glasses of whiskey. He drank them one after the other. The next day, he came in and did the same thing. Day after day, he repeated the ritual. One day the bartender became curious and asked him why he did that. “You see,” the man said, “I have two brothers, one is now in Australia and the other in Ireland. We made a pact that we will remember one another when we drink.”

Sometime later the man came into the bar, and ordered two glasses of whiskey. The bartender felt something was wrong. “I am sorry to see that you have lost one of your brothers.”

“Oh no,” the man said. “I still have two brothers.”

“Then why do you order only two glasses?”

“You see,” the man said, “recently my wife took me to church and I promised the priest that I would stop drinking.”

This story is a facetious story about thinking interdependently.

An extremely wealthy man, 65 years of age wanted to marry a young girl many years his junior. He was afraid that she might not accept his proposal. He sought the counsel of his wise friend, “Should I tell her my real age or should I lie and tell her I am 45 years old?”

His friend advised him, “I think you might stand a better chance telling her you are 85 years old.” While the story is funny, it illustrates that others may have a perspective to a problem quite different from yours.

Dig a well before you are thirsty. Chinese proverb
A man came to see his lawyer. “I want to divorce my wife,” he said. “That should not be too difficult,” said the lawyer, “I can make it neat and clean.” “No,” the man said, “I do not want it neat and clean. I have suffered so much in this marriage that I want to make her suffer.” The lawyer thought for a while, and suggested, “For the next three months, treat her like a princess. Praise her, honor her, give her everything she wants. Treat her with utmost courtesy, kindness and consideration. Then at the end of three months, without warning, divorce her. She will suffer for sure.”

Three months passed, but the lawyer did not hear from his client. So he called him. “Shall we meet and talk about your divorce?” “Divorce? Why should I want a divorce? Ever since I started treating her like a princess, I felt like a prince!”

In this story, the man experienced happiness by first giving it away. Thinking interdependently requires us to think of others, give them our kind thoughts, it tends to have a boomerang effect.

3b) Questioning and Posing Problems

One of the distinguishing characteristics of humans is our inclination and ability to find problems to solve. Effective problem solvers know how to ask questions to fill the gaps between what they know and what they don’t know.

Instinctively hidden within us is a natural desire to ask questions. Many times we suppress this instinct because we are afraid to make a fool of ourselves.

He who knows others is clever. He who knows himself is enlightened. Lao-Tse
We have been programmed not to ask “stupid” questions. Not to be a busy-body. Not to bother others. Not to be a nuisance. Not to be rude by asking difficult questions. Therefore we remain silent, allowing the natural “teacher” within us to be suppressed, instead of letting this “teacher” guide us.

We are born to ask questions. Just observe the inquisitive nature of all young children. They ask about everything including “trying” questions like “Do worms yawn?”

We come into this world with a brain hard-wired to ask questions. Formal schooling sometimes re-wires it to stop asking questions.

While we would like to encourage questions from our students and children, we often face practical problems in handling them. The two common problems faced by parents and teachers are a lack of time in answering questions and the fear that if we cannot give a reasonable answer we would look weak and ineffective.

The latter reason is easier to deal with. It is time to reframe the role of teachers and parents. They are not universal solution providers, or answer machines - they are facilitators of knowledge. Once that role has been clarified, the fear should no longer be present. In fact questions with no apparent answers enrich our lives, as they become a quest to build new knowledge.

If the student is old enough to make inquiries on his own, the teacher and parent should take the opportunity to reverse the task and ask him to find out the answers or guide him as to how to go about finding the answers. He can go online on the internet, do research at the library or ask an expert he knows. What is important is to follow through the search and hold both student and yourself accountable to seek the answer.

To know the mind is the most important task of your life. And to know the mind is to know the world. Buddhist Teaching
If the question asker is too young to find out the answer himself, you can record the question and at a convenient time, return with the answer.

The former reason of insufficient time and disruption to the flow of the lesson can be resolved by keeping a question log. Each question can be logged in a book and revisited at a planned session later. The curriculum can be designed with some spare time every few weeks to tackle questions where no immediate answers are available.

All that is needed to start cultivating a culture of questioning is the availability of time (which can be scheduled) and the realization that answer finding can be the shared responsibility of both students and teachers.

3c) Applying Past Knowledge to New Situations

Intelligent people learn from experience. When confronted with a new and perplexing problem, they will draw forth experiences from their past. They can often be heard saying, “This reminds me of…” or “This is just like the time when…” They explain what they are doing with analogies about or references to their prior experiences. They call upon their store of knowledge and experience as sources of data to support, theories to explain, or processes to solve each new challenge. They are able to abstract meaning from one experience, carry it forth and apply it to a new situation.

Constructivist theory posits that the brain is a learning machine that constructs learning on previous learning. The learner is constantly building in new information on what they already know. People learn best when they actively construct their own

Use a mirror in difficult times. You will see both the cause and resolution. The Tao
understanding. Constructivist learning also means the ability to transfer and apply knowledge from one domain to another. Many great inventions, discoveries and problems solved were simply application of knowledge from one field to another. In addition, cross cultural application and applying designs and ideas from the past can lead to some very creative ideas.

A priest came across a group of boys arguing around a dog. “What’s going on?” he asked.

“Well,” one of them said, “we found this dog, and every one of us wants to keep it. So we decided that we should each tell a lie, and the biggest liar will get to keep the dog.”

The priest was shocked, “Don’t you know that lying is a sin?”

He launched into a sermon about the Ten Commandments, about bearing false witness and lying. He ended by saying, “You know, when I was your age, I never told a lie.”

The boys looked at each other and held a quick discussion. “Okay, okay,” they said, “you win – you can keep the dog.”

The boys applied their past knowledge and concluded that the priest was lying. They were using experiential intelligence!

At an international archeological conference, three men stood talking about their cities. The Englishman said, “We have been digging up the streets of London and guess what we found?” “What did you find?” “We found pipes carrying water.” “What does that mean?” “It means that London was the first city in the world to

Our goals can only be reached through a vehicle of a plan, in which we must fervently believe, and upon which we must vigorously act. There is no other route to success. Pablo Picasso
have water piped into our homes!”

The American said, “We have also been digging in New York.”
“What did you find?” “We found electrical cables.” “What does that mean?” “It means that New York was the first city in the world to have electricity in our homes.”

The Egyptian said, “We too have been digging in Cairo.”
“What did you find?” “Nothing” “What does that mean?” “It means that Cairo was the first city in the world to have wireless radio in our homes.”

A couple of hunters chartered a plane to take them into the mountains to hunt. A week later, the pilot returned to pick them up. He looked at the wild deer they’d shot. “There is no way the plane can take all five deers, we will have to leave one behind.”

“But we did it last year.” The hunters insisted. “The pilot took the two of us and the five deers in a plane just like yours.” The pilot hesitated, but finally decided to take their word for it. “Well, if you did it last year, I suppose we can do it again this year.”

The plane took off. As it approached a mountain, it could not gain height and crashed into the side of the mountain. The pilot and hunters crawled out of the plane, dazed but unhurt. “I wonder where we are?” the pilot asked. Looking around, one of the hunters said, “I think we are about a mile east of where we crash landed last year.”

Applying past knowledge selectively!

The man who removes a mountain begins by carrying away small stones. Chinese proverb
THINKING INTERDEPENDENTLY

COLLABORATE
MUTUAL
TEAMWORK
COOPERATIVE
RECIPROCITY
HARMONIOUS
SYNERGISTIC
QUESTIONING AND POSING PROBLEMS

Across
1. To search into or examine thoroughly
5. To seek after
6. A natural state of mind when you are seeking to solve a mystery

Down
2. What the police would do to get answer
3. Can also mean the money a bank a bank pays to keep your money
4. Describe a person who is always asking questions
APPLYING PAST KNOWLEDGE

K N O N G E S E W L E D G E O F R R Y O U

U S I R V O I R

Unscramble the tiles to reveal a message
Key Points of Chapter 6
Courageous Thinking
The Habit of courageous thinking is made up of 2 strands;

• Persistence  
• Taking responsible risks

Courageous thinkers are not afraid of hard work. When the road is long and bumpy, they hold on to their seats and find strategies to help them keep going. They learn strategies from undesired outcomes and constantly make adjustments to revert to the path they are seeking.

They set worthwhile goals. BIG goals. They have the ability to stay on the task and see to the completion of their goals.

These thinkers are risk-takers. They take measured and responsible risks and develop well-researched and well thought-out plans before embarking on the venture. They are not afraid to venture into new territories. They push their personal territory and in so doing sometimes push the collective territory of the community.

4a) Persistence

Effective people stick to a task until it is completed. They don’t give up easily. They are able to analyze a problem and they develop a system, structure or strategy to attack it. They have a repertoire of alternative strategies for problem-solving and they employ a whole range of these strategies and if one strategy does not work they know how to back up and try another strategy. They recognize when a theory or idea must be rejected and another employed. Because they are able to sustain a problem-solving process over time, they are comfortable with ambiguous and uncertain situations. They thrive in a world of uncertainty.

The difference between a successful person and others is not a lack of strength, not a lack of knowledge, but a lack of will. V incent T. Lombardi.
People often give up when the answer to a problem is not immediately known. Sometimes they take the shortest route possible, even though they know it is not a good solution.

The story of great achievements by famous men like Thomas Edison and many others are peppered with the characteristics of persistence. When asked how he felt about his experiment failing a few hundred times, Edison replied, “Now I know 900 more ways how it should not be done”.

The secret of Thomas Edison’s Genius

While stories abound on Edison’s strength of persisting in his endeavors, a more insightful account of the subtle uniqueness of Edison’s view of the world and the workings of his mind will give us a formula for success.

The brain is a pleasure-seeking organ. It has a primal “program” to keep going back to what is enjoyable and pleasurable and will avoid pain. This “program” helps to ensure survival of the specie. However with the change in the environment, this primal “program” while serving us well in most circumstances, trips us up in some situations.

For example, if you are engaged in a difficult task, which is giving you pain and taking you away from pleasure (like watching your favourite television program), your brain will seek ways to disrupt that activity and “serve” you by bringing you to the television program. Thus you have this battle of the will.

You cannot really trick the brain, it is the seeker of truth and you cannot really play games with it. It outsmarts you.

If one learns from others but does not think, one will be bewildered. If on the other hand, one thinks but does not learn from others, one will be in peril. Confucius
In the case of Edison’s genius, he persisted far beyond many humans because his “failures” were actually positive, pleasurable feedback to his brain. He actually viewed them as mini-victories as he believed they brought him closer to his goals (and they did!). His now famous statement after the 900th failed light bulb experiment of “Now I know another way that cannot work” is not a cliché - it was a truth that was organized in his brain as a mini-victory.

But wait a minute - if we follow this route of thinking, we may end up with the 10,000th experiment and we would all still be in darkness (without the light bulb). Here is the second secret. Edison had developed a self-checking system. He had a way to not just eliminate the possibilities but he also had a way to gather FEEDBACK to allow him to find the key of success in his failures.

This feedback system has its foundation in metacognition, which will be discussed in more detail in a later chapter.

Encourage students to try and try again. Create an environment where persistence pays. Celebrate not just the quick answers, but celebrate persistence. Give an award for sticking to the task.

The psychological high a student gets when he has finished the task, allows him to store up the memory as a pleasurable task. He will seek it the next time; repeated many times, this becomes a disposition.

Sometimes indecision or a lack of tools causes the student to stall in his work. This “slowness” or inability to tackle the problem may not be a lack of perseverance, but a lack of skill. Teach the use of tools to unblock the mind, like mind maps, using the six thinking hats, using key words, drawing on past knowledge or simply taking short breaks to refresh the mind.

One hand must wash the other, or both will be dirty. Danish proverb
The key to motivating the student is to keep on keeping on. Don’t let the process stall. Celebrate progress however small.

Patient : Doc, I’ve tried everything to try to stop smoking, but I just can’t succeed.
Doctor : I’ll prescribe one of those new nicotine patches then.
Patient : Oh I’ve tried that too, but I just couldn’t keep it lit.

Psychiatrist : Well George, you’re making good progress, which is more than what I can say about Stanley in Ward D. He keeps telling everyone that he is buying the Vatican. Can you believe that?
George : No I can’t, after all, I’ve told him a million times, I am not selling.

Doctor : I have been practising medicine for more than 10 years.
Patient : Well call me when you’re done practising and decide to get serious.

A man walked into a bar with a cucumber wedged between his ear and head. The bartender noticed but decided not to say anything. For 40 days, the man did the same thing, wearing a cucumber. On the 41st day, he came in with a banana behind his ear. This time the bartender couldn’t resist any longer and asked him, “Why are you wearing a banana behind you ear?” “Couldn’t find a cucumber today,” came the reply.

Persistence sometimes requires us to seek alternative solutions!

Coming together is a beginning; keeping together is progress; working together is success. Henry Ford.
4b) Taking Responsible Risks

Flexible people seem to have an almost uncontrollable urge to go beyond established limits. They are uneasy about comfort and they live on the edge of their competence.

They seem compelled to place themselves in situations where they do not know what the outcome will be and courageously venture beyond their comfort zone. They accept confusion, uncertainty, and the higher risk of failure as part of the process. They learn to view setbacks as interesting, challenging and growth producing.

Responsible risk taking has to be honed through repeated experiences. It is often a cross between intuition, drawing on past knowledge, striving for precision and accuracy and a sense of meeting new challenges.

Fear of failure is the greatest obstacle to taking responsible risks.

Some scruffy looking men showed up at the Pearly Gates of heaven. The archangel recognized them as people from a certain community known for being thieves and robbers. He ran to St. Peter and asked what he should do.

“Let them in,” St. Peter said, “are we not to be merciful?”

Soon the archangel came running back. “They are gone!” he gasped.

“I told you, you should have let them in,” said St. Peter

“No I mean the gates, the Pearly Gates, they are gone!”

One cannot live in this world without the support of others. Okinawan proverb
This story while is funny illustrates the need to be wary of possible threats. That is one way of taking responsible risk.

A village chief heard that the men in his village were afraid of their wives. At a festival, when all the villagers were present, he decided to find out if this was true. So he called on all the men who were afraid of their wives to stand on his right and those who were not afraid of their wives to stand on his left.

Sure enough all the men came up and stood on his right. All but one man was standing on his left.

The village chief was pleased with this man. “At least there is one man who is not afraid of his wife.” He told the villagers. He went up to the man and asked, “Tell me brave man, what made you different from the rest?” “I don’t know?” The man said, “My wife told me to stand here.”

At a women’s liberation convention, an American lady stood up and said, “I told my husband, no more cooking, no more washing. The first day I saw nothing. The second day I saw nothing. The third day, I saw him learning to cook.”

A German lady stood up and said, “I told my husband, no more changing nappies, no more feeding the baby.” The first day I saw nothing, the second day I saw nothing. The third day, I saw him learning to change the diapers.”

An Iraqi lady spoke up, “I told my husband, no more cooking, no more sewing. The first day I saw nothing, The second day I saw nothing, The third day I started seeing a little

Even when walking in the company of two men, I am bound to be able to learn from them. The good points of one I copy; the bad points of the other I correct in myself.

Confucius
out of my left eye.”

The story illustrates that taking responsible risk is still taking risk and sometimes, but we must be prepared to pay the price.
**PERSISTING**

Across
1. Energy
2. Dependable
5. Keep going

Down
1. Ongoing
3. Propulsion
4. Concentrate
6. Lasting a long time
7. Attitude of persisting
TAKING RESPONSIBLE RISKS

ADVENTUROUS
CHALLENGE
EXPLORE
BOLD
COURAGEOUS
BRAVE
DARING
Key Points of Chapter 7

- Interesting
- Challenging
- Setbacks
- Responsible
- Producing
- Experience
- Intuition
- Knowledge
- Past challenges
- New challenges
- Accuracy
- Precision
- Persistence
- Strategy
- Structure
- Alternatives
- Comfortable
- Ambiguous
- Uncertain
- Situations

"Attacking problems..."
Exactness
The Habit of exactness is made up of 2 strands:

- Striving for accuracy
- Thinking and communicating with clarity

Many common problems can be traced to the lack of accuracy and clarity. Fuzzy thinking manifests itself in fuzzy communication (Costa). Conversely when someone has a habit of striving for accuracy and communicating with clarity, it reflects a clear uncluttered thinking pattern. Decision processes are clear and traceable in such a person. He can account for what is going on in his mind and thus can see in his mind’s eye if such a process is flawed.

The benefits of accuracy as a habit of behavior and clarity of thought and communication go far beyond just one person. Much like the digital age in communication, the signals are transmitted from one person to another with loss of signal and distortion.

5a) Striving for Accuracy

The failure of the American Patriot Missile battery in Dharan, Saudi Arabia during the Gulf War was caused by an inaccurate calculation of the time and computer arithmetic errors. The Missile failed to track and intercept an incoming Iraqi Scud missile, the result 28 soldiers were killed and 100 others injured. On June 1996, a $7 billion unmanned Ariane 5 rocket launched by the European Space Agency exploded just 40 seconds after lift-off from French Guiana. The cause of the failure was a software error in the inertia reference system. Sleipner A platform produces oil and gas in the North Sea and is supported on the seabed at a depth of 82 meters. The sinking was a result of errors related to insufficient anchorage of the reinforcement in a critical zone.

Education is the progressive discovery of our ignorance. Will Durant
History is littered with more problems caused by inaccuracies.

Students today are often careless when turning in their work. When asked if they have checked their work, they usually say yes, but give little thought to the meaning of checking for accuracy. Their concept of checking may be limited to checking if their names were written on the top left hand corner, or that they had handed the English assignment to their English teacher and not their Maths teacher. They seem to feel little inclination to reflect on the accuracy of their work. Hastiness over getting the assignment out of the way surpasses their desire for craftsmanship.

Striving for accuracy is not centered on being fastidious about things, or merely focusing on details. At the centre of this habit is the attitude of taking pride in our work. When we take pride in what we do, we do it well. Doing things well, means taking the extra effort to ensure quality and precision. If a student were to be told that his essay would be read by the President, he would certainly make extra effort to ensure that the grammar, punctuation and spellings are correct. He would surely check that the ideas presented in the essay are sound and the presentation is slick. Undoubtedly, he would check it several times and reflect on the work before handing it over. So it is with someone who “owns” the work. He may not be playing to an audience or the President, but the work will reflect the respect he has for himself in assuming ownership of it.

Whenever we view an elegant art piece or watch an enrapturing dance performance, we perceive the sense of craftsmanship that has manifested itself. If we have a chance to go behind the scenes, we will see the many hours of practice and the continual striving for accuracy in the delivery. Such is the habit that students should have. Obviously the amount of time and effort should be

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Study the past, if you would divine the future. Confucius
EXACTNESS

commensurate with the level of work that is required. Students need to be taught these skills. It does not come to them naturally.

At an international thinking conference, three men stood boasting about their countries. The Russian said, “We have ventured into the oceans of our planet explored the depths and touched the floor of the deepest ocean.” “Really?” the others said. “Well, almost, perhaps just an inch short,” the Russian replied. The American said, “We have ventured forth into outer space, the heights of the galaxies, and touched the ceiling of heaven.” “Really?” the others said. “Well almost, perhaps just an inch short.” The American replied. The Chinese said, “We have not gone down to the depths nor risen to the heights, but we have learnt to eat food though our noses.” “Really?” they asked. “Well, almost, just an inch short.” Replied the Chinese. This funny story is about “tall” stories, but also how the Chinese man cleverly made it such that it was accurate down to just an inch short.

Movie star Jackie Chan was drinking in a bar in Honolulu when lo and behold, who should walk in but the world- renowned film director Steven Spielberg! After a few drinks, Spielberg went up to Jackie and gave him a punch that sent him flying off his stool.

“What’s that for?” demanded Jackie

“That’s for all the people who died in Pearl Harbour!”

“You idiot,” Jackie retorted, “I am Chinese, it was the Japanese who attacked Pearl Harbour.”

Goals are dreams with deadlines. Diana Scharf Hunt
him a karate chop that sent him sprawling on the floor.

great panache. He was said to have made a million dollars in oil in Saudi Arabia. When he got up on stage he made the following corrections; “Firstly it was not Saudi Arabia, but Nigeria.

: I think I need glasses
: What makes you think that?
: Yesterday, I went out to the woods and I picked up a snake to kill a stick!

Problems are only opportunities in work clothes. Henry Kaiser
n cognitive maps and their ability to think critically, which is the knowledge base for efficacious action. Enriching the complexity and specificity of language simultaneously produces cognitive thinking.

f a coin, they are inseparable. Fuzzy language is a reflection of

r ‘okay’. They use vague or general nouns and pronouns, “They told me to do it.” Or “Everybody has one.” They use unqualified

l in Constantinople, the Pope was faced with a crisis of great proportions. The Catholics could no longer tolerate the growing population of the Jews in the city. Under tremendous pressure, f the Jews to his pontifical cathedral, and hand him the order personally.

k but a word to him, he will turn your word on you.” “What shall d his people have to leave the city, and tell him in the manner of th

The season of failure is the best time for sowing the seeds of success.
Paramahansa Yogananda
e great liturgy of our church; symbols without words.
"

d to the pontifical cathedral to receive the order. On the appointe
d day, the Rabbi walked into the cathedral with the cardinals and th
the officials of the church lining the aisle.

e distance
.
.
o the air
.
.
d it up
.
.
"e say that made you change your mind?
"
m that God is everywhere, so the Jews need not stay in this city.

; we believe in the Trinity which they don’t. He said, but we believe in one God; we are the same.’ "Finally I took the chalice to remind him that it was the Jews that killed our Lord. But he replied, we all ate the apple in the Garden of Eden. How could I ask them to leave, when we are one and the same."

t the Pope had changed his mind. “How did you convince him?"

"I replied not one of us is going!

g with me except an apple in my pocket and so I offered it to him. That’s when he said “All right, all right you may stay!”

y and precision. What a joke!

e businessman in the hope that business relationships would develop between them and their Chinese counterpart.

The policy of being too cautious is the greatest risk of all. Jawaharlal Nehru
n named Bill and made him an offer, “I have T-shirts, good quality, cheap. You can make a lot of money selling them.” Bill asked for a consignment. A few weeks after Bill got home, a container load of T-shirts arrived. Bill examined them. They looked good,

"Soon they were sent to the outlets and were selling like hotcakes.

g after the first wash. Then Bill called Mr. Wong on the phone. He said guarantee no shrinking and all the T-shirts are shrinking!"

o right. We Chinese read from right to left. Read the label again and you will understand what’s happening!

I forget what I was taught. I only remember what I have learned. Patrick White
Across
5. Looks good and classy
6. The right amount of change you should receive
7. This television displays really ______ images

Down
1. The opposite of wrong
2. The centre of a dart board
3. A description of high standard of work
4. The kind of diamond you like to buy
THINKING AND COMMUNICATING WITH CLARITY

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|   |   | 7 |   |   |   |   |   |   |   |   |   |   |   | 23|   |   |   |   |   |   |   |   |   |   |   |   |
| N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15| 19| 24| 23| 26|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| C | R | R | C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7 | 21| 8 | 8 | 16| 7 | 18|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10| 23| 11|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| N |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 13| 10| 23| 26| 15| 10| 26| 16|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Key Points of Chapter 8

Cognitive Clarity Precision

Critical

Accuracy

Quality Precision

Pride Teach
Self-Management
The Habit of self-management is made up of 2 strands
• Managing Impulsivity
• Metacognition

Confucius said, “Know thyself, know thy enemy, a hundred battles a hundred victories”. Self-knowledge precedes self-management.

Self-knowledge has been the secret dished out to hungry young souls by sages who lived on mountain tops. This romantic view of self-knowledge has inspired many movies and adventure stories. In 1974, Flavell coined a term ‘metacognition’ (thinking about thinking) that has ushered self-knowledge into the modern era.

Self-knowledge must ultimately result in applicable knowledge. We yearn for self-knowledge so that we know how to improve. Self-management is about using self-knowledge to improve ourselves.

Thinkers with this habit are often reflective and not given to impulsive behaviour. They can trace their thought processes and give a clear and unbiased account of their actions and behavior.

6a) Managing Impulsivity

When we think of the word impulsivity, we often think of cognitive impulsivity – acting without thinking. Impulsive behaviour shows up as impatience, difficulty in awaiting one’s turn and blurting out answers without prior thought.

Impulsive people often act on the first idea they think of.

Effective problem solvers are deliberate, they think before they act. They intentionally establish a vision of a product, an action plan, goal or destination before they begin. They strive to clarify and

When you want to test the depth of a stream, don’t use both feet. Chinese proverb
understand directions, they develop a strategy for approaching a problem, and they withhold immediate value judgments about an idea before they fully understand it. Reflective individuals consider alternatives and consequences of several possible directions before they take action. They decrease their need for trial and error by gathering information, taking time to reflect on an answer before giving it, making sure they understand directions, and listening to alternative points of view.

Before embarking on an experiment Edison would usually ask his assistants to find out from the library or other sources of information, if anyone else had done something like it. He did this so that he would not be repeating the same experiment or he could learn from other similar experiments. Edison took time to plan and research. He did not just jump into the experiment impulsively.

In our classrooms, students usually rush to put up their hands in order to answer a question. They usually don’t take time to ponder and check in their heads if the answer makes sense, or if it is accurate, or if it is precise.

Impulsive behavior if carried into adulthood can result in many serious problems at the work place.

Managing impulsivity is not just about slowing things down, but is also about having a sense of deliberation in your answers or decisions. Obviously in some situations, like rescuing a drowning person, you have to act fast, but even one second planning can help the situation like checking to see if there is a float nearby.

Out in the countryside, there was a priest who owned a horse that

Weigh the situation, then move. Sun Tzu
he used to do his visiting. Being a pious man, he taught his horse all the commands in religious language. One day a parishioner wanted to borrow the horse for an errand.

The priest explained, “You must know that my horse understands only commands using religion as the language. When you want it to walk, you say Hallelujah!. If you want it to go faster you say Praise the Lord!. If you want it to stop, you say Amen!”

The parishioner thought to himself – that is easy and said, “Hallelujah!” and the horse galloped off. He was enjoying the ride so much that he did not notice the trail led to the edge of a cliff. He panicked and forgot the commands, he said “Stop!”, but the horse kept going. Finally he decided to pray “God help me Amen!” lo and behold the horse suddenly halted, just one step from the cliff. The parishioner looked down and heaved a sign of relief and gave a loud cry “Hallelujah!”

Of course we know that that will cause the horse to gallop. The story plays on the habitual use of the expression without thinking - that is being impulsive!

During the French Revolution, three men were arrested and charged with treason and sentenced to death by guillotine. One was a priest, one a farmer and the other a carpenter. The priest was the first to go. The executioner asked him, look up or look down. He bravely stepped onto the block and said “I am not afraid to look death in the face, I shall look up.”

The executioner pulled the lever and the blade fell halfway and stopped.

Opportunities multiply as they are seized. Sun Tzu
The executioner said, “According to the rule, you are free to go.”

Next it was the farmer’s turn. “Look up or look down?” the executioner asked.

The farmer said, “Look down”.

Again the blade fell halfway and the farmer was let off.

Finally the carpenter stepped onto the block. The executioner asked, “Look up or look down?” The carpenter said, “I will not be afraid, I will look up.”

He was placed on the block with his face looking up at the guillotine and the wooden frame supporting it.

Just as the executioner was about to pull the lever, the carpenter shouted excitedly, “Stop, I can see what the problem is!

The carpenter should think before talking about the guillotine!

6b) Metacognition

Some call it the “pinnacle of mental functioning”. Some say it enables us to be successful learners. Metacognition is thinking about thinking. It is the ability to know what we know and what we don’t know. Although inner language, thought to be a prerequisite for metacognition, begins around five years of age, some psychologists believe that metacognition blossoms during the puberty years. Metacognition has been called by many different names and manifests itself in various forms, some of which are as follows;
• The knowledge and awareness of one’s own cognition and the ability to monitor, regulate and evaluate one’s thinking.

• The ability of individuals to better control their own thinking to become more efficient and flexible learners (Brown, Campione, Flavell)

• The ability for checking, planning, selecting, monitoring and interpreting on-going experiences

• The state where one is conscious of one’s thinking whilst thinking (Cohen 1994)

The major components of metacognition are developing a plan of action, keeping that plan in mind over a period of time, and then reflecting on and evaluating the plan upon completion.

The Russian psychologist, Alexander Luria found that interestingly not everyone achieves the level of formal operation of metacognition. He estimated that only 60% of adults have ever engaged in metacognition.

There are several ways to enhance metacognition, here are some suggestions;

**Knowledge and control of self.** Monitoring your own progress as you learn. Central to this knowledge of self and self-regulation

> Be the change you want to see in the world. Mahatma Gandhi
are commitment, attitudes and level of attention required for a task. The person must have the skill to will (Paris and Cross 1983).

**Knowledge of process.** Many people may not even be aware of how their thinking processes work. You need to know that before you can make changes you must adapt your strategies in response to the knowledge of how you are doing. Identifying and teaching these strategies will help students become more metacognitive.

**Knowledge of control.** Planning, evaluation, self-reflection and responsibility, goal setting and time management help students to gain control over behavior and poor thinking.

Metacognitive knowledge refers to the thoughts of what one knows, what one is currently doing or what one’s mental state is. It comprises of 3 categories; person, task and strategy variables.

**Knowledge of person** refers to the individual knowledge about one’s own learning process. For example, you may be aware that your study session will be more productive if you worked in the library (less distractions) than at home (more distractions).

**Knowledge of task** includes knowledge about the nature of the task and the type of processing demands that it will place on the individual. For example, you may be aware that it will take more time for you to read and comprehend a science text than a novel.

**Knowledge of strategy** is the ability to choose the appropriate strategy to tackle the task. This may include the need for knowledge of person as well as the knowledge of task. For example you may be aware that you work better during the morning than in the afternoon, and so schedule more learning time in the morning and more task oriented activities in the afternoon.

A great teacher never strives to explain his vision. He simply invites you to stand beside him and see for yourself. R. Inman
Metacognitive regulation

This involves the use of metacognitive strategies, which are sequential processes that one uses to control mental activities and to check if the goal has been met.

For example, after reading a text, the learner may mind map the key words in the text. Her goal is to understand the text. Mind mapping is a tool to help enhance metacognition. Questioning is another technique. The learner may also ask herself questions after reading the text. Self-questioning is a common metacognitive comprehension monitoring strategy. If she finds that she cannot answer her own questions, then she may decide on going back to the text or refer to other text that are related to the topic.

Effective learners are self-regulating learners.

Metacognition is a critical attribute of successful learners. Arriving at an answer is only the beginning. Knowing how you arrived at the answer is the key to knowing problem solving strategies and how to tackle more difficult questions in the future.

Metacognition separates the expert learners from the novice learners.

Two monks were on their way home to their monastery. They came to a river, and saw a beautiful young woman standing by the bank. She told them that she needed to get across but was afraid. The older monk took her into his arms, and carried her across. He put her down on the other side, and the two monks continued their way.

If names are not correct, language is not in accordance with the truth of things. If language is not in accordance with the truth of things, affairs cannot be carried on to success. Confucius
An hour later, the younger monk asked, “How could you do that? You touched a woman, you carried her.”

The older monk replied, “Yes, I carried her, but I put her down. But two hours later, you are still carrying her in your mind.”

This story illustrates the way our mind works. Our thoughts are constantly swimming around in our minds. Metacognition helps us to manage those thoughts, understand ourselves and make those thoughts swim in the right direction.

Once upon a time in Timbuktu, there was a tribal king who loved to hunt. Every hunting season he would be out with his faithful assistant. Now his assistant had a strange habit, whenever anything happened he would say, “It is good, it is good.”

One hunting day, as the assistant was handing the rifle to the king, he accidentally pulled the trigger. The rifle went off and blew off the little finger of the king’s left hand. As the king screamed in pain, the assistant exclaimed, “It is good, it is good.” The king was really annoyed and threw him into prison.

The next hunting season came and the king went on his own and unfortunately came across another tribe. This tribe was known to be savage cannibals. They captured the king and brought him back to the village to make dinner of him. As they were cleaning him, they noticed that he was short of a little left finger. This tribe was superstitious and would not eat anyone who was blemished. So they let the king go.

On his way back the king realized that what his assistant said came true, that it was good that his little finger has been blown off.

The way to change other’s mind is with affection, not anger. The Dalai Lama
On his return he pardoned the assistant and brought him into his court. “I am sorry I threw you into prison.” The assistant said to the king “It is good, it is good.” “How can it be good?” the king asked “You just spent one year of your life in prison.” “Well,” said the assistant, “if I had not been in prison, I would have been out hunting with you!”

Good thinking, assistant! He was able to trace the processes and make mental notes and evaluation.

A man started a business and bought a used car. It had no cassette player or radio. A friend asked him how was it driving in silence without any music. “I do a lot of thinking,” said the man.

A year later, business took off and the man traded in his used car for a new one. Not only did it have a radio, but it came with 10-CD changer, cassette and a 6-speaker system.

“I thought you do a lot of thinking while you drive?”

“Yes, now you know what I was thinking about.”

I started school in the first grade. Years passed, but I didn’t. Henry Youngman
MANAGING IMPULSIVITY

Across
3. Thinking carefully before acting
4. There is an eerie _____ before the storm
5. Can also mean a person in a hospital

Down
1. To have mastery over a situation
2. Light bounces off these surfaces
METACOGNITION

V A E U A I I M P B Z D E H S
V I W U L Y O C O M N A V S V
H L O A E U E W J K M P E L V
K N A I R S M U M F K N W T B
E W F N T E I C S W S I H V Q
W I S A N Q N K S U S A G H Q
K W M I E N C E O I J A A O Z
M A T C S K N I S L N U T W I
P V K R S T C B Y S R F P O P
L D T K Y S F A I G H L A X A
M F G K N E V A L U A T I O N
I V H O G N I W O N K U W N S
N Z C I T F B E N K Y Q B B F
Q E Y L P O F E K I R G N R S
W M R N G C D U N T P N W E W

ALERTNESS
EVALUATION
AWARENESS
KNOWING
CONSCIOUSNESS
PLANNED
Key Points of Chapter 9

- Will 2 Skills Self Control
- Thinking Process Knowledge Meta Cognition
- Planning Control Reflective Retaining
- 1974 Word C in PWEL
- Learner Successful Attribute
- Sepa + e novice expert
- Impulsivity Envision Destination Plan Goal Alternatives
- Trial and Error
- Consider

Henry 2011
Laughter gives us distance. It allows us to step back from an event, deal with it and then move on.

Bob Newhart

Time spent laughing is time spent with the gods.

Japanese Proverb

Silliness
The Habit of silliness is made up of 1 strand

- Finding Humor

Researchers have yet to discover any other specie of living creature that exhibits humor in their behavior. Perhaps it is a quality that is only found in humans, and for a good reason. Psychologists and medical researchers have found increasingly more evidence to suggest that humor contributes positively to many aspects of human existence. These range from positive social effects, creativity, healing and happiness. It is perhaps a panacea for many human problems.

Since early human civilization, the role of humor has been highly valued. Think about the court jester, though seemingly frivolous and yet he is so critical in the king’s court that he is indeed a staff member of the cabinet.

Bob Hope, the late American comedian, used to travel to the battle front lines to cheer soldiers in their sombre duty of fighting.

Dr. Patch Adams believes that humor is the most important element in health that he founded the Gesundheit Institute, a medical centre in West Virginia USA where humor is used as an essential part of the medical therapy. Physiologically, humor’s positive effects include a drop in pulse rate, secretion of endorphins and increase oxygen in the blood. Humor has been found to liberate creativity and provoke such high-level thinking skills as anticipating, finding novel relationships, visual imaging and

Interestingly, research has shown that the brain first analyses the joke using the left side of the cortex, the frontal lobe (involved in socio-emotional responses) then becomes active. The right hemisphere then carries out the intellectual analysis to “get” the joke. The sensory processing area of the occipital lobe then gets activated and the motor sections evoke a physical response to the joke.

Thus laughter invokes the front,
making analogies. People who engage in the mastery of humor have the ability to perceive situations from an original and often interesting vantage point.

Apart from helping problem solving, humor has myriad benefits. The humor “evangelist” who has gone round the world prescribing humor and laughter as a medicine is none other than Dr. Madan Kataria. He started the laughter club. Dr. Kataria said, “Laugh yourself silly and your sense of humor will start flowing. Laughter Clubs are the ideal platforms to laugh your way to silliness, because there is no fear of ridicule by anyone.”

A sense of humor is the capacity to perceive or relate an experience or situation in a funny and humorous way. Research shows that a preschool child can laugh up to 300 to 400 times a day, but adults laugh only 30 to 40 times a day. What happened to grown ups?

Laughter is the psychological response to humor. Laughter consists of two activities, the production of sound and a set of muscle movements both simultaneously activated.

Laughter is a universal language. It unites and it is familiar. It can be used by both kings and peasants to make life more pleasurable and rewarding.

Neuropsychologist, Prathiba Shammi, said that, “Humor plays a powerful and unique role in human life with wide ranging effects in many aspects of human function. Among other things, it ties society together, it helps us cope with daily stress and it has a positive effect on the immune system.

How does having a sense of humor help us in the thinking process? In the processing of the humorous information or situation,
the brain activates both the right, left, front and back lobes.

This helps to “exercise” the brain and activates the “whole brain”. Whole brain learning and problem solving has been found to be superior, because you can “see” a wider perspective. It helps the brain to analyze a problem from more angles.

Since telling a joke or using humor requires you to find incongruence or displacement of context or an unusual perspective to life, the use of humor also enhances a person’s creativity.

In a Singapore newspaper report on Feb 2005 of medical workers in the Tsunami stricken location of Meulaboh, Indonesia, Assistant Nurse Irawathy Sudarson said “The other nurses in our group kept me going. Sometimes I would get so tired but someone would crack a joke and make everybody laugh, and we would get the strength to continue.” Humor helps in persisting!

Humor is just another defense against the universe. Mel Brooks
Key Points of Chapter 10

- EVIDENCE
- HUMOUR
- Laughter clubs
- Katerina
- Court Jesters
- Adam
- Gesundheit Medical Centre
- Therapy humour
- Humans thrive on creativity
- Social healing
- Happiness
- Laughter
- Whole
- Language
- 300+ day!
Practical ideas for cultivating S.U.C.C.E.S.S.

In this section I have chosen to use the student as a proxy for the individual. The ideas here can just as easily be used in the home and office.

These ideas can be viewed as starters and are certainly not exhaustive. You may wish to share more ideas by sending us an email at info@artcostacentre.com. We would certainly, with your permission, be happy to share that information on our website at www.artcostacentre.com.

1. Flexibility in thinking

Flexibility in thinking is essentially keeping the mind supple. As with any muscle, keeping it supple involves stretching it and allowing every strand to be utilised often. Taking this analogy, flexible thinking can be cultivated by several activities listed here.

a) Celebrate multiple solutions

This can be easily introduced in the classroom. In promoting

Our progress as a nation can be no swifter than our progress in education. J.F. Kennedy
flexible thinking, it is important to keep the thinking process going and not bring it to closure too quickly. Instead of saying, “So did everyone get fifteen as the answer?” We should keep the thinking going by saying something like, “So Kathy has fifteen as her answer, did anyone come up with a different answer?” “How many ways can we arrive at the solution.” “In this situation, is it possible to have more than one solution?”

b) Introducing the “other side”

Stories such as “Three Little Pigs, from the wolf’s point of view” or “Giants have feeling too”, story of Jack and the Bean stalk from the giant’s point of view.

c) Debates

Essentially debates are controlled and well-defined arguments. Debates are wonderful in creating multiple perspectives to a subject matter. The choice of the subject or topic in this case is crucial. Sometimes, even if the topic seems to be very skewed towards one side, it can be very surprising how the “other view” can be substantiated.

Certain movies are also wonderful for encouraging flexibility in thinking. Classics such as “12 Angry Men”, a story of a jury of 12 men, gives multiple perspectives to a situation or case.

d) Role playing

Role-playing, requires a person to take on a different perspective and act accordingly. Cognitively the person has to deliberately think outside of himself and say constantly, “If I were Martha, what would I do and say?”

“All that we are is the result of what we have thought. Buddha
It gives the student a brief moment of change in mindset. It is also fun and engaging and many students will enjoy that. Mostly, depending on the subject matter, it also engages the habit of finding humor.

A follow-up discussion on how the student felt when playing the role, or asking them to justify an action or behaviour he has made; uncovers the richness in the role-play activity. Questions like “Why do you think Martha wanted to do that?” brings on the empathy and understanding.

**e) Building scenarios**

Building scenarios engage a system of thinking and challenge the student to a cause and effect pattern finding.

The student working in a group, challenges and seeks out the various ramifications of policy decisions, impact of people’s reactions, potential factors to derail the outcomes. It fires the imagination as well.

**f) Playing what-if games**

The what-if games are similar to scenario building, but in much shorter and piece-meal basis.

This can be incorporated in history, science, geography or social studies lessons. Questions such as “What do you think would happened if Christopher Columbus had not discovered America?” Or “If Sir Stamford Raffles had chosen Bintang Island as his trading post instead of Singapore, in what ways would Singapore be different today?”

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*The great end of education is to discipline rather than to furnish the mind: To train it to the use of its own powers rather than to fill it with the accumulation of others.*
In domains such as science we may ask questions like “If most people live to 100 years, what would society be like?

2. Creating Imagining and Innovating

E. Paul Torrence was intrigued with the idea of measuring creativity in the individual. At a time when many believed that it was a potential that was immeasurable, he rose to the challenge. He believed that creativity could be taught. Considered by many as the “father of creativity”, he dedicated his life to the research and teaching of creativity. His measure of creativity was based on three broad criteria;

- Number of ideas generated
- Fluency of ideas
  (i.e. how many different types or categories of ideas)
- Originality (how rare are those ideas)

If we constantly exercise the student’s ability to meet these criteria, we would have increased their creativity quotient.

One of the best tools in helping the mind to do all three activities that measure creativity are Mind Maps.

Reading widely and being interested in a wide variety of things in life helps to create more associations and generate more ideas.

Leonardo Da Vinci exhorts us to be “interested in everything” because “everything is connected to everything else”.

Lawrence Baxter, chief e-commerce officer at the Charlotte bank Wachovia says, “For me reading widely outside of one’s discipline has been probably been the biggest source of ideas.”

Time spent laughing is time spent with the gods. Japanese proverb
Networking and working interdependently are other ways to generate ideas. “My network is where I get my best ideas,” says Dave Clarke, Vice President of Enterprise Technology Services at the American Red Cross (Washington, D.C.). “I have a small number of people that I talk to fairly regularly, and I think we have a good exchange of ideas.”

**Making Creativity an Every-day affair**

In everyday situations, at work, in the classroom and at home, continually recognizing and speaking about creative solutions will help create a culture of creative thinking. Creativity should not be held up as a “once-in-a-blue-moon” event, or a very intentional highly sacred occurrence or activity that we do on special occasions.

Following Leonardo Da Vinci’s thinking that “everything is connected to everything else”, being able to see connections and relationships is one characteristic of a creative mind. Simple exercises and games can cultivate such a mind. Some of the games are:

- Find similarities between two unrelated items for example a goldfish and a spacecraft.
- Play brainteasers such as puzzles and riddles.
- Create puzzles and riddles
- Watch illusions and think of how they are performed, then reading or watching a video on how it is done.
- Play games such as:
  - Expressing one’s sensory input through another, for example creating a visual depiction of a classical piece of music.
  - Creating poetry from listening to a piece of classical music that has no lyrics.
  - Reading a short story and drawing a picture from it
  - Describing taste in terms of colours

“If I were not a physicist, I would probably be a musician. I often think in music. I live my daydreams in music. I see my life in terms of music… I get most joy in life out of music.” Albert Einstein
- Describing sounds or music in terms of colours
- Giving facial expressions to the letters of the alphabet
- Finding connections between extremely disconnected subjects, for example engines to ballet dance or ball bearings to love.
- Creating jokes - humor is considered the highest form of creativity.

Teresa Amabile, Edsel Bryant Ford Professor of Business Administration and head of the Entrepreneurship and Service Management unit at Harvard Business School postulates in her theory of general creativity that there are three essential components of general creativity at the workplace;

- Domain relevant skills
- Creativity relevant mental processes
- Task motivation

**Domain relevant skills**

In-depth knowledge in a particular domain is essential. Intimate knowledge in a particular domain gives the creative problem-solver more choices. However creative problem-solvers are also open to continuous learning and tend to apply knowledge or solutions from other domains into their domain of expertise. This is echoed by Csiksentmihalyi who found that a key characteristic of creative individuals is their mastery of a domain of knowledge or skill. We should therefore encourage students to pursue a body of knowledge or skill that they are most passionate about. This could be as diverse as ranging from biology or in-line skating.

**Creativity-relevant processes**

Creativity-relevant processes are skills of fostering creative problem-solving. Breaking the perceptual mind-set is one such example. Mind Mapping is a creativity-relevant process.

*Dig a well before you are thirsty. Chinese proverb*
Suspending judgment, remembering accurately, playing with imagination, daydreaming and applying heuristics are other examples.

**Task motivation**

Task motivation refers to intrinsic motivation. Creative problem-solvers and problem-finders are highly motivated in their work. Nobel prize laureate physicist Arthur Schawlow, talking about creativity said, “The love-of-labor aspect is important. The most successful scientists often are not the most talented, but the ones who are just impelled by curiosity. They’ve got to know what the answer is.” Albert Einstein talked about intrinsic motivation as “the enjoyment of seeing and searching.” The novelist John Irving said, “The reason why I can work so hard at my writing is that it is not work for me.”

Csikzentmihalyi also concluded that a major distinguishing characteristic of creative people is the capacity to experience “flow” - the state of mind that experiences timelessness and oneness with the activity that one is engaged in. They become caught-up in the process of creating. He estimates that flow states are usually no more than 2 hours at a stretch and that it can occur up to several times a day.

Tony Buzan concluded that creativity is a whole-brain activity and when the individual learns to engage both sides of the brain, creativity is enhanced and one way to activate both sides of the brain is to use Mind Maps.

**Imagination**

Imagination is the creation of images. This can be done mentally or physically. Here are some ways to promote creativity through the use of imagination.

> A good teacher has been defined as one who makes himself progressively unnecessary. — Thomas J. Carruthers
- Drawing images and pictures.

- Creating imageries that interact with the 5 senses is a powerful way to exercise the imaginative mind. Involve the sense of touch, smell, sight, sound and taste!!

- Creating metaphors and making stories stirs the imagination like nothing else.

- Playing zany imagination games like imagining what it would be like if apples were blue, or if eggs were square.

- Scenario building also activates the sense of imagination. This is particularly wonderful in problem finding.

**Innovation**

Innovation is the application of creative solutions and ideas. Revisiting the ‘Post It Note’ story, recall that Dr. Spence Silver had accidentally developed a “useless” glue. It took him five years of sharing this glue at 3M before he met Art Fry who later developed an innovative use of the glue by making a connection between his bookmarks, which kept falling off his hymnals, and the concept of the ‘Post It Note’. It was the use of the habit of creating, imagining and innovating and the habit of interdependent thinking that sparked off the development of a historical product.

Product development, marketing and discoveries are all littered with hundreds and thousands of stories like Dr. Spence Silver and Art Fry’s. Tune up your antenna and listen, you will soon start to pick up these stories and maybe you will soon have a similar story to tell!

The aim of education should be to teach the child to think, not what to think. John Dewey
An acrostic of the factors to foster greater creativity is listed below

**Connecting** and discovering relationships between things or subjects is a creative process. Transferring applications from one domain to another exercises the creative muscles of the mind.

**Reflecting** on information and knowledge helps in the incubation process. This process is an essential part of creative thinking. During incubation the brain plays with the information and knowledge and with the help of imagination starts to create applications for the information and knowledge.

**Experiencing** and stimulating the 5 senses. The more information, ideas and experiences a person has, the more “seeds” he can sow in generating ideas. Enjoying a rich range of experiences through the five senses helps create more thoughts and tickles the imagination.

Taste and enjoy all kinds of food and drinks. Chefs, bakers and cooks are highly creative people. They have a keen sense of what combination of “edibles” go well with each other. They constantly experiment and create new dishes. When eating out, try different types of food. Be adventurous instead of sticking to what you are familiar with. Take responsible risks.

Experience different weather conditions. When you take a walk in the park, or a nature reserve, try taking the same walk in fine weather, in the rain and in the night and feel the difference!

Feel the magnificence of the sea during a storm. Watch the rain. Smell the forest in the early morning.

Read a wide genre of materials. Read a wide variety of authors. You may prefer a certain style of writing, but do something unusual

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Education is what survives when what has been learned has been forgotten. B. F. Skinner
once in a while. Buy that book that least appeals to you – experience the style of a writer that you are not familiar with. Compare and contrast that to authors you know better.

Listen to a wide range of music. If you dislike a particular style of music, maybe just listen to it once, and look for positive points where you can appreciate the music. This concept applies to watching movies as well. Experience a wide range of cultures through food, books, music and movies.

Try the theatre, drama, concerts, musicals, and other performing arts.

**Applying** past knowledge and ideas from across domains.

**Timing** – give a thought “incubation time”. The creative process cannot be rushed.

**Enjoying** the process and developing a love for the work (Schawlow)

3. Continuous learning

If the mind is likened to a lake, then continuous learning is the stream that refreshes the lake and prevents it from becoming a stagnant pool.

We are all born with a biological need to learn, and the more you learn the more connections (physical neuron connections) your brain makes. Researchers on learning and ageing now believe that this biological need to learn lasts throughout our entire lifetime. This keeps the other functions of the brain in tip-top condition. Plan your learning. Even in school, where the school syllabus is already drawn out for you, you can still plan to learn to play the piano, roller blade, make cookies or play a new video game.

*The real problem is not whether machines think but whether men do.*

B. F. Skinner
Balance the learning “diet” by learning a physical skill, a mental skill and a social skill.

As important as the motivation to learn is the skill to learn. Before you embark on more learning, you should;

- Learn how your memory works and how you can improve it.
- Learn how to make associations and create ideas with Mind Maps.
- Learn how to take notes using Mind Maps.
- Learn how to manage large amounts of data and information with Mind Maps.
- Learn how to read and retain large amounts of data and information by understanding how our brain takes in information through the eyes. Learn and practice speed and range reading skills.
- Know how the learning curve works and make it work for you.
- Learn the SM²ART® way (see page 167).

4. Listening with understanding

Practice the 3Ps of listening: Pause, Paraphrase and Probe.

When you **pause** to listen and in between listening, you allow yourself to integrate the information, feelings and context of what the speaker is saying. **Paraphrasing** what the speaker has just said allows you to confirm the facts and also informs the speaker that you have indeed been paying attention to him. **Probing** allows you to ask pertinent questions to “fill in” the missing jigsaw pieces to allow you to see the whole picture, or to make sense of the story in your mind.

Learn to suspend judgment and place yourself in the other person’s shoes.

It’s not that I’m so smart, it’s just that I stay with problems longer.
Albert Einstein
Develop sensory perception skills. Show a 10-minute movie without the sound track and ask the students to guess the feelings, intent, and content of that segment. After that play the movie again, but this time with the soundtrack, see how much communication they received without a word being spoken.

Model the art of listening with understanding.

You can be the most influential person in cultivating this habit. As you model the meaning of listening with understanding by applying the process of the 3Ps, you communicate on a daily basis the personification of skillful and sincere listening.

5. Sense of wonderment and awe

Creating the sense of wonderment and awe by bringing the mysteries of different subject areas into the classroom or home. The brain is a truth-seeking mechanism. It also seeks closure. So intrigue your students with mysteries such as the pyramids or Stonehenge. Whet their appetite for scientific research by plumbing the depths of genetic science. Show them inexplicable phenomena like the deep-sea volcanic eco-system and newly discovered creatures. Ask questions like:

“How was the English language developed?”

“How was the Great Wall of China built? Did you know that it is the only made-made object that can be viewed from outer space?”

“Can you explain the concept of infinity?”

There is so much wonder in this world to share.

The general who wins the battle makes many calculations in his temple before the battle is fought. The general who loses makes but few calculations beforehand. SunTzu
Television shows like CSI, National Geographic and Discovery Channel can provide the feeding ground for awe and wonderment.

6. Using all senses

Leonardo da Vinci said that the average person “looks without seeing, listens without hearing, touches without feeling, eats without tasting, moves without physical awareness, inhales without awareness of odor or fragrance and talks without thinking.”

We all need to increase the use and sensitivity of our senses.

Create a “Sensational Week” by playing games emphasizing one sense per day for one week.

**Monday. Vision Day**

Draw all the hairstyles of your classmates.
Have a notebook to draw the individual hairstyle of each classmate.
Give a name to the hairstyle. Group the hairstyles, see if you can detect similarities and differences. Are there any famous people who have the same style?

Look at your own face and body in the mirror and try to find something you have not noticed before. Do it in private!

Describe the color of the sky.

Create a magical creature.

**Tuesday. Hearing Day**

See how many different noises and sounds you can pick up
in one day. Describe them.

Listen to your favourite song. Describe the feeling of that song in terms of colors and taste.

Find a place or room where there is silence. Listen to it.

Listen to the sound of the wind.

**Wednesday. Smell Day**

When you awake, detect the first smell, write it down, and describe it.

See if you can recognize your friends through smell. Do they have a distinctive smell?

Go out to the park, or field and smell the grass, leaves, and plants. Break a leaf and smell it.

Does your school bag have a smell? Your ruler, pencil, pen, paper. Be a “dog” for 10 minutes. “See” by smelling.

**Thursday. Tasty Day**

What is the first taste you experience in your day. When you eat, find out (guess) what ingredients went into the dish. Try to figure out what methods were used to produce the end result. Create a cookbook by writing down the ingredients “reverse-engineer” style and the preparation steps.

Try something (food or fruit) you have never eaten or tasted. Discover.

Learning without thought is labor lost; thought without learning is perilous. Confucius
Enjoy your tasty day!!

**Friday. Touch and Feel Day**
Find words to describe at least 10 different types of surfaces you will touch today. Can you increase that to 20?

Give your friend or pet a hug.

Touch a fish.

Play a game with your friend. Blindfold yourself and using only your hands, identify 10 different objects brought to you by your friend.

7. Questioning and Problem Posing

Questioning is a natural activity that the mind engages in all the time. We only need to allow it to carry out the activity instead of suppressing it. We suppress questioning on certain anti-questioning dispositions such as “It’s rude to question.” Or, “Let’s leave it to the expert, they should know what they are doing, let’s not ask too many stupid questions.” Or “Let’s not waste time questioning, just do it!” Good questioning habits are cultivated from an earnest desire to understand. It stems from a discomfort of not knowing the “whys”.

We actually ask questions in our minds constantly. Keep a question log to help to “capture” these background questions that our minds keep asking us.

Keeping a log, helps you to record the questions that you think are significant and allows you to go back to the log to start the search for the answer. Sometimes in the course of the day or over a period of time, the answer to the question becomes apparent.

N o matter how busy you may think you are, you must find time for reading, or surrender yourself to self-chosen ignorance. Confucius
Problem-posing is a high form of the cognitive process. It usually comes in the form of a “What will happen if…” or “Did I plan for that event or eventuality?” “Hey, if this kind of thing happened to me, I would be ...”

Similar to the question log, keep the problem alive in your mind and work towards finding a solution to it to make the habit work for you.

In the classroom, a corporate questioning habit can be fostered by asking the class to put down three or four questions about a particular topic before your teach it. For example a class may start off with the teacher saying, “Class, we will be exploring the topic of volcanic activity today, what three questions would we like to ask before we begin?”

The class may generate questions like;
“Do volcanoes exist under the ocean?”
“Has anyone ever sent a probe into a volcano and seen how far into the earth it could go?”
“Why are there so few volcanoes today?”
Subsequently each student is expected to come to class with prepared questions.

In the office, questioning sets the good companies apart. The quality of a company is directly correlated to the kind of questions that are being asked in the board rooms and the cubicles.

Improving the quality of questions asked requires a climate of mutual respect. Management needs to open itself to questions about why certain policies are implemented. They need to allow themselves to come under the scrutiny of the staff members who will be carrying out the strategies or who are affected by policies.

Our greatest glory is not in never falling, but in rising every time we fall. Confucius
themselves need to constantly ask themselves if there are better ways to make sales, or how marketing is carried out. They constantly need to pose “what if” problems or draw up scenarios. Problem posing moves the organization from a reactive mode to a proactive mode and finally to a creative mode of thinking.

Conversations at home similarly can be used to exercise the mental habits. Mealtime conversations can be problem posing time or questioning time.

Applying the question of “why” to basic facts such as “why do we need to work?” and drilling the “why” five times often exposes interesting truths or principles.

The early Greeks did that in the synagogues and Parthenon’s … creating great philosophies of life that we still use today.

8. Applying past knowledge

Leonardo Da Vinci’s connectivity principle that “everything is connected to everything else”, exhorts us to look for relationships in at least two dimensions. One dimension is through finding a relationship across different domains of knowledge. For example the combination of biosciences and engineering created new fields such as bioengineering and biotechnology. Another dimension is time. Traversing the domain of time allows us to glean with hindsight, what worked and what did not. Both outcomes provide tremendous sources of learning. What did not work in the past may now work based on the availability of new technology and knowledge. Finding relationships and ideas across cultures is also likely to help the thought process when a problem has no immediate and apparent solution.

When it is obvious that the goals cannot be reached, don’t adjust the goals, adjust the action steps. Confucius
Author’s comment: To do this, apply the SMART way of achieving your goal.
Encourage the habit by asking bridging questions such as “What can be gleaned from our knowledge of geography that can be applied to this maths problem?

Are there patterns of conflict resolution in the Cuban Missile crisis that we can apply to the situation in Iraq today?

Make transference of past principles to applications today by doing comparative studies and analysis.

Reach deep into the recesses of your past experience as you ask, have I encountered a similar problem before? How did I resolve the problem in that past situation.

Constantly finding application across domains and time and drawing parallels encourages the habit of applying past knowledge.

9. Thinking Interdependently

Group work is a great way to foster interdependent thinking. However students new to group work need to know the basics of working together as a team and develop skills such as leadership skills and be equipped with thinking tools such as brainstorming.

Rotate the leadership of the team. Give guidance and counsel to the leader on good leadership skills.

Help them to elicit group thinking and harness the power of the group. Finding out the mental inclinations of each member of the group helps the leader to mine the mental potential.

Thinking interdependently can also be fostered by seeking views from classmates and friends on a variety of topics. For example an
issue like “Would it be a good idea to start a casino in our country (or state)” could be a project each student could put together. The way to do this is to gather two differing views of people (whether in or outside the school) and incorporate that into their own argument (whether for or against).

Thinking interdependently has benefits for creative thinking. As Dave Clarke of the American Red Cross says “My network is where I get my best ideas.”

At home, making group decisions as a family helps each member of the family to see each other’s viewpoint on the matter.

In the office, interdependent thinking elicits a greater sense of ownership in the final decision.

10. Persisting

A good start to developing persistence is to help your students to develop a plan to achieve a goal. Start with a very short term goal, like completing the maths problems. You can help them to divide the task into 30-minute sessions. Teach them how to explore ways to overcome difficulty when they become stuck on a problem, like trying a different approach, or thinking about past questions they have encountered and the strategies they used to solve it. Teach them to back-up on a problem and approach it from another perspective. Finally teach them where and how to get help. At the end of this session give them a reward appropriate for that task. The reward itself should not be a distraction or be bigger than the task. Intrinsic motivation must ultimately replace the need for any reward. However the initial journey can be spiced up and made more fun if zany rewards can be placed at various milestones of the journey.

Success is a lousy teacher. It seduces smart people into thinking they can’t lose.

Bill Gates
Set out projects that require longer term planning like a project to build an aquarium or a hamster house. Break the task into a series of steps and set milestones. For example, setting up the fish tank. It will require considerable fact finding on the price, size and type of tank. Once you have made the purchase of the tank, celebrate a little. Document the project in a scrapbook.

Then comes the type of fish to put in the tank. Again research is important in helping the family decide on the fish, do you want fish that breed easily or fish that are easy to care for or fish that look lovely to watch. Buying the fish and creating the environment that best supports the fish will take some time. Once the fish is in the tank, have another milestone celebration. Then the naming of the fish is great fun. And finally naming the tank - for example after someone who had great persistence, like Thomas Edison will add the final touches of a project that is both fun and that practices the habit of persistence - sticking to a task until it is completed.

Something about rewards...

Some parents are concerned that giving rewards might lead to children looking to external gratification instead of an intrinsic sense of excellence. There are no side effects if the rewards are 1) negotiated upfront 2) Not linked to rewarding moral behavior 3) Not bigger than the task itself and 4) not emphasised more than the task.

Rewards are good for encouraging and developing new habits. Once the neural pathways are set, the habit will soon replace the need for reward. Think about how we get into the habit of brushing our teeth. Our parents might initially have had to entice us with little rewards, but once the habit was formed, it took on a life of its own.

Thinking is the hardest work there is, which is probably the reason why so few engage in it, Henry Ford

Author’s comment: Many people do think, but few think skilfully.
This is what we want to achieve in forming the habits of mind.

Creating worthwhile goals makes the individual tasks worthwhile.

Children have a hard time looking at the big picture. This ability to see the whole is an attribute of great leaders and thinkers. This “helicopter” view is valued in large corporations and often one of the factors determining the employability and promotion of staff.

The ability to see the “big picture” has a strong correlation with the habit of persisting. This ability helps people stay on a task no matter how small or difficult because they know the importance of that task in the process of achieving the larger vision. Many who persisted were very clear of the reason for persisting. It is a high view of their goals that drives them to keep on going on. It is something that is bigger than themselves that allows them to delay gratification. Sometimes delaying the gratification for more than one lifetime! In the case of Terry Fox, his goal was bigger than his life, as he knew that there was a high possibility that he would not complete the mission. Yet, his persistence and courage inspired the world to continue the worthy goal of cancer research. Today, millions are benefiting from the persistence of Terry Fox.

**Teaching skills to get out of the rut.**

There are many excellent tools to help students get out of the rut.

Knowing how your brain works in creating memories, will help a student find better ways of remembering formulas, dates, names, places and facts.

Teaching how to Mind Map will help students to organise their thoughts, make learning fun, generate more ideas,

> Few people think more than two or three times a year; I have made an international reputation for myself by thinking once or twice a week. George Bernard Shaw
managing projects and learning with a “helicopter view”.

The SM²ART Way To Achieve Goals

A simple way to developing a strong habit of persisting is embodied in a system of planning called SM²ART. This is a way of pursuing a goal.

Start with a goal

Make your goal worthy. Make the goal measurable. Make it achievable. Make it public. Write it down and paste it on a wall or place where you will see it every day.

In particular when you make your goal public and you talk about it, several things happen. People will help reaffirm your goal. If for example, you decide to pursue the goal of becoming a concert pianist. Talking about it may lead you to someone recommending you to a great concert piano coach. It also creates a cheer team for you. For example when they meet you again they may ask, “So how is your piano playing coming along?”

Measure.

Decide how you will know if you are getting nearer the goal. Create a record book or diary so that you know how far you have come in your pursuit. For example, in the piano playing goal, you may have a series of progression on levels of

No problem can withstand the assault of sustained thinking. Voltaire
piano exams or you may have a chance to audition for performances.

Monitor the process of getting to the goal
At regular intervals take stock of your progress or lack of it. This is a feedback mechanism. Seek feedback from others like your friends, coach, teachers or parents. Receive these feedbacks positively.

Adjust your process
Using the information from the feedback, make adjustments to the process. If you are not sure how to make adjustments, seek professional help from a teacher or mentor. Find out how you can make progress that you are happy with.

Resume the process
After making those adjustments, get back on the path. Continue the journey.

Triumph!
If you run through the SM²AR steps – you will soon be on your way to Triumph. No matter how many times you need to run the SM²AR, you will certainly reach the Triumph stage.

11. Taking responsible risks

We take risks every day, in every situation even in indecision there is risk. Create a way to weigh risk. One simple way is to ask these four questions;

Reward

What is the reward we are seeking to attain? Does it justify

It is not the IQ but the I Will that is most important in education. A non.
the risk taken?

**Individual**

Who are the people who may be affected by this decision or venture?

Have they been informed?

Have their views been taken into account?

**Safety**

Are there “safety nets” or “safety valves” in the event there is danger. What kind of dangers are there, physical, health or financial?

How can we create “first-aid-boxes” strategies to rescue the situation if something unexpected happens?

What is the worse-case scenario?

Can we bear the loss? Are human lives involved?

**Knowledge**

Do we know enough about the matter to make a sound judgment? Are there experts we can go to for advice? Is there past knowledge we can seek to avoid pitfalls?

Encourage students to take risks in project work, but balance that encouragement with guidance and good counsel. After the project, conduct an analysis of the risk-taking process. How can they make better judgment in the future? Is there any lesson they can carry into future risk taking?

Know one self and know your enemy, one hundred battles, one hundred victories!

*Chinese proverb*
Take the fear out of risk by teaching them the SM²ART way of working. If they have developed the process of self-directed adjustment, they will be able to continually make adjustments to their goals and processes to minimize risk.

The biggest risk is not the risk of failure; it is the risk of failing to try.

One of the greatest disservices we can do for our students is to train them to avoid risk. Conversely, encouraging risk taking without proper risk management techniques and disposition would be like sending soldiers into battle without proper combat training and equipment. The school environment is the safest environment for students to learn to take risks. Create situations to train them and habituate the habit of taking responsible risks.

12. Precision of language and thought

As you receive unclear forms of communication, use skilful questions to clarify and make more precise the speaker's intent.

When you speak, practice clear language. Giving essential details in a task for example, instead of saying “clean your room”. It could be better communicated with the 5Ws and H. Why, when, what, who, where and how.

Being aware of the intent of the communication as it is important in determining the degree of clarity and the level of precision. If you are giving directions to a driver, it is important to be exact in your details.

If you are describing an event that has just happened, you might do well to decide the relevant facts in order to avoid an

College is not the place to go for ideas. Helen Keller
information overload.

If you are trying to persuade someone to buy your charity ticket, details about the charity and why they need the money does help you get the buck.

Set the standard of communication in your classroom by rejecting fuzzy communication. For example, if a student comes up to you and says, “I am not feeling well today.” You may want to ask for details like, how are you not well? Can you describe the problem? Which part of your body does not feel well?

If students say, “My friend says its O.K.” You may want to ask “Which friend? . What is her name? Is she a school friend?” “What is O.K?”

It is important for each student to check their work for clarity of communication. Setting high standards of accuracy in communication will stretch your student’s precision abilities.

13. Striving for accuracy

Striving for accuracy in performing a task is quite easily achieved through a process of checking, editing and verifying. At a deeper habitual level, the habit of striving for accuracy is effected through a sense of ownership of the task, a sense of craftsmanship and a desire for excellence. Various practices build the habit of striving for accuracy. The first is to create an environment that values craftsmanship. In this environment, work that displays a high standard of craftsmanship is rewarded. A piece of well-written essay can be celebrated and talked about. Speak of the good choice of words, and language. Commend the detailed research that went into the essay. Praise the use of accurate diagrams and clean lines.

Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime. Chinese Proverb
used to draw the pictures. In mathematics, accuracy can be measured by the low rate of arithmetic errors, the accurate use of nomenclature and symbols or the right description of units of measure.

At the workplace, materials should be proofread before it is sent to the printers. If the cause of the lack of accuracy is the lack of time, can projects be rescheduled to allow more time to be accurate? Is market information reliable? Or is it based on rumours and gossip? Are critical decisions based on such information?

14. Managing impulsivity

A key source of conflict in the workplace can be traced to impulsive behavior. Blurtng out a comment too quickly can cause hurt and resentment amongst co-workers.

Reigning in impulsive behavior at work needs constant reminders to think before acting. Ensuring that each task has a plan, no matter how simple helps to manage impulsivity. At the start of the day, drafting a simple plan for the day helps you to make more effective decisions on the use of time and also gives you a quick overview of what needs to be done first.

If you are teaching a young class, you may try to establish simple rules in the class, for example setting a rule that after you have asked a question, everyone must count to 10 before giving the answer. For older children, you may ask them to plan and show their plans to you before embarking on the work.

It is especially challenging to coach skills in impulsive children. Delivering and coaching skills requires a lot of verbal diplomacy or the message gets pushed away as unfair criticism. The coaching voice is calm, clear and objective. The calming qualities soothe the
impulsive child’s excitability and anxiety and the affection supports the image of the coach as one who stands on their side against the problem of impulsivity. Since impulsivity can easily escalate into anger and even physical abuse, coaches must not precipitate more problems by responding with harsh tones, intimidating or threatening forms of communication.

How do you coach your students to manage impulsivity?

Time is one of the key concepts in managing impulsivity. In a classroom setting, established wait time is one method to signal to the class that managing impulsivity is valued in the class. You can create a rule where no one can put up their hand or blurt an answer until they have counted to 5 after the question has ended. Timing in conversations can also be taught. One analogy is how cars pass each other on a single lane road. You must wait till there is a clear stretch or an appropriate time before it is your turn to pass. Children can be taught to wait till someone finishes his conversation or has made a point or concluded his point before talking. Watching for non-verbal cues such as facial expressions or hand gestures also adds to the control of impulsive behaviour.

15. Metacognition

One of the difficulties of working on habituating metacognition is the “invisibility” of the process. We have to use various methods to draw out the thinking and make it explicit to enable us to monitor and instruct. Here are several ideas you can use to help cultivate the habit of metacognition.

**Questioning**

Skillful questioning helps to direct a student’s thoughts and can

> We only think when we are confronted with a problem. John Dewey

Author’s comment: When you are not problem solving, engage in problem finding.
help train metacognitive skills. Questions such as “Why did you choose this over that?” are one way to activate the process of metacognition. “Describe the steps you took to arrive at the answer.” Is another way. “What assumptions did you make in order to arrive at the answer” are good questions to engage the person’s metacognitive awareness.

**Encourage reflection**

Keep a mind or thought journal and record your reflections. In scaffolding student’s thinking, the initial journals may follow a pre-ordered structure such as “Things I did well”, “Things I did not do well” and “Things that surprised me”. Subsequent stages may require the journal writer to state the reasons why those “Things” are the way it was. Final stages of the journal guidelines may include a section on measures that the writer would take to change things in the future. Find an accountability partner to keep you on track on reflection. Share your reflections.

**Feedback, evaluation and use of rubrics**

Giving and receiving feedback is a good way to engage and cultivate metacognition. Creating the feedback criteria using rubrics would give a person organized opportunities to think about what success would look like at every stage. Before embarking on the task, have the person plan the strategy to achieve the desired outcome. After the task or event, assess his performance based on the rubric to give him the opportunity to relate what he has targeted as success against what he has achieved. Make written notes on why he did or did not achieve his targets to encourage metacognition.

> A man is not idle because he is absorbed in thought. There is visible labor and an invisible labor. Victor Hugo
16. Humor

Find humor in the workplace to make the working environment fun and enjoyable. Being able to laugh at yourself is a liberating and de-stressing process. It will also win you friends. Enjoying humor and comedy on television or the theatre builds the habit of finding humor. Practice making puns. It is a creative process and also develops your vocabulary.

Valuing S.U.C.C.E.S.S at the workplace.

One powerful way of encouraging students to value the habits is for the school to incorporate it in its staff appraisal system. When students know that even staff members are being measured against the standards they are being taught, it sends out a powerful message that the habits of S.U.C.C.E.S.S. is a real-world application which they have to take seriously. It moves the concept from theory into practice right before their eyes.

An example of how such an appraisal system can take place is illustrated here. At The Art Costa Centre for Thinking and its sister organizations, staff are appraised using the habits. In that particular environment, it may not be necessary to adopt all 16 habits.

A way to foster a greater sense of ownership and identity with the habits is to allow the staff to select the core habits that they wish to adopt. A convenient number is about 5 to 7. The process of making the selection allows them to understand and assess each habit.

A shared vision of how the habits can help them become more competitive in the market place highlights the reason for valuing the habits.

The secret of success is constancy of purpose. Benjamin Disraeli
Practising Habits Of S.U.C.C.E.S.S at home

The home is a good place to start practicing the habits of S.U.C.C.E.S.S. Seek consensus among your family members to select 5 to 7 habits that you think you would like to have as a family. This set of Family Habits will be like a hallmark of your family. Create an acronym or slogan with this set of habits. Find a place on the wall to put this up and create icons or posters to remind you of the habits you have chosen. Find opportunities to talk about these habits over mealtimes, when discussing a problem, or when making decision together. Talk about current events and bring the habits into juxtaposition, for example when the family is watching a television show, you can use the habits as points of discussion about the flaws or the good points of a particular character.

For my family we had chosen the following; Creating, imagining and innovating, Listening with understanding and empathy, Impulsivity management, Persisting, Precision of language and thought, Open to continuous learning, Humor

The acronym of the habits spells CLIP-POH. POH is part of the Chinese name my wife and I share, and clip is to put both of us together. We chose the 7 habits based on what we value as a family. We also found a place in the house to put up posters, changing the poster once a week. Therefore over 7 weeks we would have reminded ourselves of the habits we have chosen.

During study time or meal times, where appropriate, we talk about the habits, particularly in problem solving. When guests come over to our house, we explain the posters—giving us another opportunity to deepen our commitment and understanding of the habits.

Never express yourself more clearly than you think. Niels Bohr
Key Points of Chapter 11
Mind Mapping and the Habits of S.U.C.C.E.S.S.

Mind Mapping was invented by Tony Buzan. It gained popularity after the launch of the classic book “Use Your Head” in 1974. Since then more than 5 million books written by Tony Buzan have been sold and it is estimated that more than 200 million people around the world mind map.

The use of Mind Maps is a wonderful way to promote and sustain the habits of S.U.C.C.E.S.S.

Metacognition

Mind mapping helps to develop metacognitive skills through the constant need to assess the associative relationships between items placed on the mind maps. The process of mind mapping is a learning process because the mapper needs to choose key words.

What is a Mind Map®

A Mind Map® is a powerful graphic technique which provides a universal key to unlock the potential of the brain. It harnesses the full range of cortical skills - word, image, number, logic, rhythm, colour and spatial awareness - in a single, uniquely powerful manner. In so doing, it gives you the freedom to roam the infinite expanses of your brain.

The Mind Map® can be applied to every aspect of life where improved learning and clearer thinking will enhance human performance.

* Mind Maps are the registered trademark of the Buzan Organisation
Keyword choices require a metacognitive process of comparing several words at once and making a decision on which word to use. Experience mappers take a fraction of a second to arrive at the choice. Quality of choices improves over time as the mapper does more mind mapping. Mind mapping correctly trains the brain in metacognition. After choosing the key words, the mapper needs to make meaningful associations between the key words through the drawing of branches. This exercises the metacognitive skill of the mapper as he chooses the branch relationship.

The habit of metacognition can be further exercised by the mapper as he explains to himself the relationships between the branches and links on the mind map. The mapper has to retrace the decision process and thus create a metacognitive exercise. This can also be used by an instructor in a classroom setting. Retracing the process helps improve memory by strengthening the visual memory trace as well as the logical memory trace.

In the workplace, metacognition is enhanced through the review of the decision and thinking processes displayed by the mind map.

Thinking Flexibly

Flexible thinking requires the thinker to hold the central thought while pursuing a divergent range of ideas. The flexible thinker can process various solutions and scenarios in parallel and “see” its effects and implications in the mind’s eye. For this purpose, Mind Mapping is one of the best thinking tools. The central image focuses the brain on the subject while allowing the thinker to freely explore the myriads of possibilities without losing the centrality of the subject.

In addition, each thought is connected to the central image and

“Tony Buzan didn’t invent the brain - he did invent the instructions!” John Husbands, M.D., Institute of Management.
therefore linkages and relationships are evident to the thinker almost instantaneously. The ability to record thoughts on paper in this manner relaxes the mind from the fear of being lost in the expanding thoughts. When the thoughts are documented in a radiant fashion, it mimicks the way the brain develops those thoughts. The thinker can return to the map at any time and obtain a bird’s eye view of the thought processes. This bird’s eye view allows the thinker to reassess his thinking pattern and enhances further flexible thinking.

A fun way of thinking flexibly and creatively would be to create a mind map with no central image. This activity can be used to solve a problem such as “Where to go for a family holiday”. Each family member creates a branch of his ideal place to have a holiday. Each branch is then brought to the mind map and placed around a blank space (see example). The family members then take a few hours or even a few days, to see in their mind’s eye a place that can fulfill the central image.

Once a possible central image is found, that is where the vacation should be!

Similar problem-solving approaches requiring flexible thinking can be conducted.

Creating, Imagining and Innovating

One measure of creativity is how far removed is the thought from the original thought and yet still retains a relationship. In this respect, the radiant nature of Mind Maps can expand a thought almost perpetually while retaining the relationship with the original thought. This is almost like a space ship maintaining contact with the central command while exploring the galaxy.

Business and other organizations have many needs that can be satisfied by properly constructed Mind Maps. Clive Lewis
Another measure of creativity is the quantity of ideas generated. The radiant nature of Mind Maps generate ideas at a phenomenal rate. Studies have shown that Mind Maps can easily create up to 10 times more ideas than traditional brainstorming techniques. The root word for imagination is creating pictures. The mind naturally creates pictures. We think in pictures! Mind Maps encourage the use of images to enhance thinking. The drawing of pictures in a Mind Map stimulates the mind to generate more ideas as it triggers the whole brain to work together, therefore multiplying the thinking efficacy.

Innovation is the application of creative ideas in practical ways. Mind Maps allow the thinker to generate more innovative products and solutions in the same way it enhances creativity and imagination.

Persisting

A component of persistence is knowing how each piece of work is significant to the whole. Often students cannot see the significance in the task they are doing and therefore trivialize it. They then give up easily as they think it is not worth putting so much effort to achieve a trivial task.

Mind Maps give the thinker a clear picture of the role of each part of the task. The role of each task is also clearly marked out and thus allows the thinker to seek alternative solutions if the current solution is not working out the way it was anticipated.

Persistence is also enhanced as the Mind Map allows the user to be creative in seeking multiple solutions. It passes control over from the situation or event over to the mapper. For example, if a strategy does not seem to work well, the person can return to the Mind Map and see how a new strategy can be developed.

"Tony Buzan's Mind Map Book will do for the brain, what Stephen Hawkin's A Brief History of Time did for the universe" Raymond Keene, OBE, Chess Grandmaster
based on the analysis of the old strategy in relation to the Mind Map. Perhaps a new branch can be developed off a different aspect of the project.

Listening with understanding and empathy

If a thinker starts to mind map the thoughts of the speaker, the thought patterns of the speaker become more evident to the listener. In a situation when the speaker is a lecturer, Mind Mapping the lecture focuses the mapper on finding the main themes of thought and relating each thought to the previous ones. If no apparent relationship can be found, a new theme is mapped and expanded upon. Listening for key words for placement on the map sensitizes the listener to “listen between words” much like reading between the lines (or even behind them!).

Even if the speaker does not inspire, the listener can inspire himself with lots of imagery in his maps, thus keeping himself interested in the topic.

In a one-to-one listening situation, the listener can also Mind Map the conversation. If it is inappropriate to Mind Map during the conversation, the listener can Mind Map the conversation afterwards. The very thought of doing it sharpens the listening ear in the same way as though the Mind Mapping was done on the spot.

Managing impulsivity

When we encourage students to make a habit of planning before doing anything no matter how small or trivial the task may be, they learn to manage impulsivity. One fun and simple way of planning is to do a mini Mind Map of the task. This can be a

“If I am concern about having too much or what to cover in a speech, I organise it by Mind Mapping the material.” Ken Blanchard Author of One Minute Manager
quick single-color Mind Map for small and trivial tasks and a more elaborate full-colored one for more major tasks.

Precision of language and thought

There are misconceptions that Mind Mapping is detrimental to language development. This conclusion is drawn from the understanding that mind mapping uses single words, and the words, when connected are void of conjunctions and punctuations. However that perception of mind maps is wrong. While Mind Mapping does not engage whole sentences, it is not meant to replace the written text. It certainly is not competing to replace poetry and expressive writing, it is designed to mimic the way the brain thinks. The brain certainly does not think in complete sentences. As Mind Mapping uses fewer words, the choice of words attains a high level of importance. This choice requires the thinker to be very clear of the language he uses to represent the thought. This process of choosing key words carefully trains the mind to be precise in its thinking and therefore cultivates the habit of precision of language and thought.

Interdependent Thinking

The power of interdependent thinking can be harnessed through the use of Mind Maps. Here are just two examples.

**BrainBlooming**

In brain blooming, groups generate ideas with the use of Mind Maps. Each member of the team first takes between 5 to 10 minutes to individually, without any discussion, create their own Mind Map of ideas around the common theme or problem. Each chooses a central image they feel best describes the theme or problem and then draws as many branches and sub branches as
they wish and fills them up, drawing more as it becomes necessary. After the individual exercise, the team members come together to add on to each other’s ideas by writing down on pieces of paper (Post-It notes are great for this activity) each idea. Overlapping ideas are automatically merged.

The pieces of ideas are then placed on a wall and everyone in the team takes an overview of the ideas and starts to suggest themes that these ideas can be regrouped into. Active discussion is encouraged at this stage.

This process can be done over a few hours or a few days. Once there is an emergence of themes and the group is happy with the themes, a new Mind Map is drawn, with the main branches as the themes and the ideas grouped as how the team sees it.

This new Mind Map is the collective thoughts of the team. A true meeting of minds and a collectively forged vision!

A second method of using Mind Maps to facilitate interdependent thinking is to work on a group Mind Map. In this method of working, a commonly agreed central image is drawn. If a common image has not been agreed, then it can be left “blank” for the moment, but the central idea or problem can be articulated. The main branches are then decided upon and each member of the team works on developing the branch. This completed branch is then grafted back onto the central image (or a central blank space). Each “branch” member then articulates his idea about the branch. If there is no central image at the start, this will be a good time to talk about a common vision (ie a central image).

Striving for Accuracy

I believe that an ability to Mind Map is a lifelong skill that everyone can apply to good effect in a corporate development environment. A / Prof Chang, National University of Singapore.
Mind map engenders a sense of craftsmanship. Students and adults who draw Mind Maps often direct their efforts in creating beautiful Mind Maps. As they focus their attention in making their Mind Maps attractive and beautiful, the mind is actually being given a "revision" of the lesson or work. This is because our brain naturally remembers images. Revision as the word suggests is simply "seeing again"!

Choosing key words is also an exercise in accuracy. Choosing the relationship of the branches requires careful thinking and planning. Choosing images and colours all add to the process of accuracy.

Applying Past Knowledge

Mind Maps enhance memory and therefore are a natural ally in building the habit of applying past knowledge. They make easy management of information because of their ability to put massive amounts of information on a piece of paper, they allow the user to see in a larger perspective the inter-relationships among the information. This helps make greater connections between subject areas.

Taking Responsible Risks

Mind Maps help you to plan your undertaking. The multi-ordinate nature of Mind Mapping, allows you to cover more angles of thought and helps you see the possible pitfalls and risks. This method of planning and managing reduces risk by making it easier to identify risks. In the same way it "reveals" the risks through better thinking, it also allows you to see the variety of possibilities in tackling the risks.

Mind Map is the true global language. Mr Ronald Tan, Executive Director, Singapore Institute of Management.
Example of using a Mind Map for planning a class excursion.
Open to Continuous Learning

A key component to continuous learning is the joy of learning. As Mind Maps are really enjoyable to create, they make the learning process fun and entertaining. They facilitate quicker absorption and understanding of information therefore they aid in the cultivation of the habit of continuous learning.

Responding with Awe and Wonderment

When you present a beautifully drawn Mind Map of a subject, you inspire awe and wonderment. Information presented in a “brain-friendly” way promote a sense of wonderment of the subject matter.

The natural beauty of the Mind Map and the drawings that build it, evoke similar emotions like those who admire a masterpiece painting in a museum.

Consider the following description of the Pyramids

The great pyramid of Giza is the oldest and only surviving member of the “Seven Ancient Wonders”. The pyramid is believed to have been built over a 20 year period. Although the method of construction is shrouded in mystery, two theories have been proposed. One involves the construction of a straight ramp that was raised as the construction proceeded. It was thought that mud and water helped to lubricate the movement of the stones on the ramp. The other theory suggest that the blocks of stones were placed using long levers.

Throughout history, the pyramids have amazed the imagination. Napoleon was believed to have said “Soldiers, from the top of these Pyramids, 4000 years are looking at us!”. The pyramids were also referred to as “Granaries of Joseph”, referring to the episode of the seven years of famine as described in the book of Genesis in the Bible.

The dimension of the pyramid is 481 ft in height. It remained as the tallest structure on earth for more than 4300 years until the nineteenth century. The sloping angle is 51 degree and 51 minutes. Each of its side is carefully oriented with the compass point of north, south, east and west. The sides of the base is 751 ft and each length has less than 0.1% error.

The structure is made up of about 2 million blocks each weighing more than 2 tons. It was estimated that all these blocks can build a wall of 10ft high and 1 ft width surrounding the country of France! The area occupied by the great pyramid can accommodate St. Peters in Rome, the cathedrals of Florence and

Therefore, using Mind Maps as an in-class exercise is one more tool that economics instructors can add to their portfolio of active learning activities as they seek to move beyond “chalk and talk” (Becker and Watts 1996)
Now consider the same information presented in a Mind Map here.
Finding humor

No other tool allows you to infuse humor like Mind Maps. Because of the infusion of drawings, images and symbols in the mind map, many Mind Mappers actually draw hilarious and funny pictures as a way to help make the lesson or task fun and entertaining. The mind loves such images, in the same way that we are drawn to cartoons. Caricatures, cartoons and funny expressions all add to the inclusion of the habit of finding humor into learning and working. Consider the following Mind Map.

Example of a Mind Map employing humor.

“My kids become more focused when I used Mind Map in my classroom”. Beijing Teacher
Using All Senses

Strong memories are built around a strong association of all the five senses to the thing, event, word or equation that you wish to remember. Mind Maps can help you establish a visual imagery of how the “smell”, “taste”, “feel” “sound” and “sight” of the image.

In addition to the imagination, there are scented pens and ink, acrylic markers that can make a Mind Map tactile and aromatic.

Consider the following image of photosynthesis.
Questioning and Problem Posing

A basic way of improving questioning and problem posing is to draw a central image of the task or problem at hand and adding branches on the “Who, What, Why, When, Where and How” and then using each branch to expand on the question. For example a school project on how to reduce noise in the school canteen may be drawn as follows;

The nature of Mind Maps can facilitate richer and broader associations and hence better learning. Buzan
A Recent Experiment

In a landmark exercise conducted by the BBC in 2002 and aired on the BBC programme “In Search of Genius”, Tony Buzan conducted a series of lessons for six of the worse performing students at one of England’s poorest schools. Psychologists from the Institute of Education, University of London tested these students. The tests and interviews placed them in the category of educationally subnormal range.

Tony Buzan spent twenty one hours of intervention sessions over a six-months period to work with the students.

During these sessions, Tony Buzan introduced the following concepts
1. Mind Mapping
2. Brain Theory and Physiology
3. Memory
4. Reading and Comprehension
5. Study skills
6. Creative Thinking
7. Mind and Body Integration
8. Thinking Skills
9. Multiple Intelligences
10. Ethics and Citizenship

They were taught through activities and exercises on how to mind map. Tony also taught them about how their brain works, teaching them that with simple training, they can actually improve their memory. He also encouraged them to use their senses, increase their creativity and self-confidence.

The same educational psychologists tested the same students after the intervention lessons and found remarkable improvement.

The nature of Mind Maps can facilitate richer and broader associations and hence better learning. Buzan
At the end of the six lessons over six months, the student's abilities improved so much that these same psychologists said that if they had not tested the students themselves, they would probably not have believed the results of the tests.

At the end of the program, the students put together a “show and tell” session for both educators and parents. The improved abilities of the student astounded even their parents.

In the concluding report by the psychologists from the Institute of Education, University of London, they noted that in the areas of verbal reasoning skills, selective attention and verbal recall, the intervention had a significant impact. In particular there were notable improvements in the development of essential learning skills in the following areas;

- Greater flexibility of thought
- Less impulsivity
- Improved use of strategy
- Greater confidence
- Improved expression / more articulate
- Use of self-correction and self-monitoring strategies
- Metacognitive strategies

For more information on books and courses on, contact;
support@buzanasia.com or visit the Buzan Centre Asia Limited website at www.buzanasia.com

"...a new generation of Mind-Mapping software can also be used as a digital “blank slate” to help connect and synthesize idea and data - and ultimately create new knowledge.”
Bill Gates, founder of Microsoft
Story of Jack, the Beanstalk, the Oracle and the Thinking Goose

In a land far away, there lived a farmer and his wife. The farmer was a kind man and had helped many of his neighbours in their time of need. His wife was a loving woman who loved to cook and loved to have friends come over for dinner at their simple home in the middle of their farm.

The farmer and his wife had a son by the name of Jack. Jack grew up to be a clever little boy who loved his parents very much. Over the years the family lived off the land. The weather was good and each year the crops yielded a good harvest for 7 good years. Then there came unusual events in the weather patterns and the crops started yielding poor harvests. One day the farmer said to Jack, “Son, our crops are not doing very well, and we need to sell the cow to get some money to sustain us. Can you take the cow and go down to the market place to sell it for some money.”

Jack dutifully took the cow and went on his way. He packed some food and drinks for the long journey into the town where the market place was located. After 3 days, Jack finally entered the town and was walking towards the market place to sell the cow when he saw a strange old lady. The lady saw the desperate look on Jack’s face
as he pulled his cow along. She signaled him over and called out in a scratchy voice. “Come over here little boy!” Jack, mesmerized by her gnarled weathered face went over to her. “What are you to do... do... with the cow?” The lady asked with a stutter. “Oh I need to sell the cow for money because the land is not yielding very much crop now,” said Jack. “Well I can give you something more... more... valuable than money if you give... give... me the cow.” The lady negotiated. “What is that something?” asked Jack curiously. “Well it’s the... the... seed of knowledge of the... the... future my boy.” The lady said. “I...I... don’t really think so, I really need some money,” Jack replied, feeling afraid and suspicious at the same time.

“Well, let me tell... tell... you something little boy” the lady explained, “They... they... call me the oracle around here and I...I... have given some very... very... good advice to many... many... people. You will regret it if... if... you don’t take my offer!”. The oracle persuaded. “Anyway I really need the cow for... for... the milk it can give me, my... my... bones are getting brittle and I... I... need to have some calcium.” As the oracle pleaded, Jack started feeling sorry for her. He felt that maybe she could be right. “All right, I will trade my cow for your seeds.” So with that, Jack became the proud owner of the seed of knowledge of the future. “Live well my... my... boy and don’t... don’t... forget to share the knowledge!” the oracle said, as she walked the cow towards the town. “Hey wait, what should I do with it!” Jack said as he turned around. But in a flash the oracle was gone.

Jack was both excited and fearful. He thought to himself, what if the oracle was telling the truth, and yet he was afraid to be wrong. He ran most of the way back to the farm.

At the farm, his parents were eagerly waiting for his return. When he came back and told his parents what happened, they said
to him. “Jack, we are not sure if you made a good decision, but since you took a risk to get these seeds, let’s plant them and see what happens.”

They planted the seeds just outside the house and made sure it was well watered and received sunlight. Three days passed and nothing happened. On the fourth day, just as their hopes were waning, Jack saw a green supple leaf shoot through the ground. On the fifth day, there was a beanstalk standing in their garden rising over the top of the clouds.

Jack and his parents were astounded. He decided to climb it to see what was at the top. Soon Jack was above the clouds and there he saw the most unbelievable sight. The land was vast, but there was only one road leading to a giant house.

As Jack came near to it, a giant came out of the house and spoke in a thundering voice saying, “You must be Jack!” Jack was terrified, “How did you know my name?” “Oh the oracle told me. See she is right here in the house.” As he spoke the oracle came out of the house, no longer gnarled looking and no longer with the scratchy voice, saying, “I am delighted that you took my advice. I will now reward you for your effort by giving you the thinking goose.” The oracle handed Jack a goose wearing reading glasses. It looked almost like a school headmaster.

The oracle sat jack down over tea and told him the future. “Dear Jack, let me tell you what will happen soon... ..

1) The world will change. Farming will give way to industrialization. Industrialization will give way to computerization and computerization will give way to societies who can create new ideas, who can create new products, and solve many
of the world’s problems.

2) The way people are taught will also change. At this time when farming is important, people teach their children how to farm. Farming ideas and techniques did not appear to change rapidly and so information did not change so fast. Formal, mass education is not so critical in this age. Skills can still be taught from father to son.

When the industrial age comes, people will need better education in new skills such as engineering. There will be a great demand for educated workers who know how to operate machines, work in factories and sell goods. During this time, the education system will become more widespread and many will attend school.

When the computer age comes people will be able to talk to each other across the seas. Every nation can be visited by airships and people can travel across the earth in less than one day. Ships on the ocean can carry vast amounts of produce from every nation on earth. Food prices will drop, goods will become affordable, and productivity will rise to an all time high. Every one will live like a king.

After the computerization age, the world will enter an age of thinking. Where information is now available at a touch of a button, whether you are 5 years old or 85 years old, you can access the same amount of information. Information will become cheap, thinking skills will become expensive because many will not know how to think. The schools will have for more than 100 years been teaching people knowledge and how to get knowledge, they will have forgotten to teach people to think, to be good problem-solvers, to be creative
and to generate ideas.

At the end of the talk, Jack was in a daze. He wanted to know more, but the oracle said it was time for him to return home. He will have the goose as his companion and the goose will help him. Jack and his family began to work the farm with new knowledge. The goose was constantly asking Jack questions to help him think. Jack developed advanced farming techniques that helped the farm produce 100 times what it normally would have yielded. He began to teach them to others as well. The community prospered and also became a thoughtful caring community.

Jack continued to lead the community in thinking about the way their children developed and learn. They began to raise a community of thinkers. Over time they overcame many of the problems that beset their world, just like what the oracle told them would happen.
Stickers for use in any creative way you can think of
bibliography

1 Alma E. Guinness, ABC of The Human Mind, Reader’s Digest, 1990


3 Buzan, Tony, Use Your Head, BBC Worldwide Publishing, United Kingdom, 1995


5 de Bono, Edward, Serious Creativity, Harper Collins, London, 1993


7 Costa, Arthur L. and Kallick Bena, Activating and Engaging Habits of Mind, ASCD, Virginia, 2000


10 Costa, Arthur L. and Kallick Bena, Integrating and Sustaining Habits of Mind, ASCD, Virginia, 2000


12 David, F. Bjorklund, Children’s Thinking: Developmental Function and Individual Differences, Wadsworth/Thomson Learning, Belmont 2000


16  Gardner, Howard, Multiple Intelligences; The Theory in Practice, Basic Books, New York, 1993

17  Gelb, Michael, How To Think Like Leonardo Da Vinci, Random House, New York, 2004

18  Gladwell, Malcom, Blink; The Power of Thinking Without Thinking, Little Brown and Company, New York, 2005

19  P.J. Pinel, John, Biopsychology, Allyn & Bacon, Massachusetts, 1997


21  Montessori, Maria, Dr. Montessori's Own Handbook; A Short Guide to Her Ideas and Materials, Schocken Books, New York, 1965

22  Montessori, Maria, The Four Planes Of Education, Association Montessori Internationale, 1971


27  Prensky, Marc Digital Game-Based Learning, McGraw-Hill, New York, 2001

28  R.C. Orem, Montessori and The Special Child: An application of Montessori principles to educating the handicapped, the disadvantaged and other children out of the norm. G.P. Putnam & Sons, 1969

29  Kramer, Rita, Maria Montessori, A Biography,

30  Reader's Digest article “Laughter Can Heal” June 2004 edition


33 Howard, Steven, Asian Words Of Wisdom, Talisman Publishing, Singapore 2003

34 Straits Times, article “At Agilent, even PhD holders need retraining” page H22, October 21 2004

35 The Straits Times article “Getting to the HA Ha-eart of the matter” Mind Your Body, November 24 2004

36 The Straits Times article, “Assistant Nurse Irawathy Sudarson”, Mind Your Body, Feb 9 2005

37 Television Corporation of Singapore, Channel 5 program titled “Bringing Up Kids, Episode 1” aired sometime in January 2002.

38 Toi, Henry, My Little Thinking Book 1, Nurture Craft, Singapore, 1998


40 Wong David, Make Them Laugh, Help Them Learn Vol 2, BAC Printers, Singapore 2004

41 Wong, David, Make Them Laugh, Help Them Learn Vol 1, BAC Printers, Singapore 2002

42 http://brain.web-us.com/brainwavesfunction.htm

43 http://hbswk.hbs.edu/tools/print_item.jhtml?id=3030&t=strategy accessed 12 Feb 2005

44 http://hbswk.hbs.edu/tools/print_item.jhtml?id=3605&t=strategy accessed 12 Feb

45 http://hbswk.hbs.edu/tools/print_item.jhtml?id=4318&t=strategy accessed 12 Feb 2005

46 http://hbswk.hbs.edu/tools/print_item.jhtml?id=543&t=strategy accessed 12 Feb 2005

47 http://heartquotes.net/Education.html
48  http://plato.stanford.edu/entries/children/
49  http://puzzlemaker.school.discovery.com
50  http://quotations.about.com/cs/inspirationquotes/a/Knowledge4.htm
51  http://quotationspage.com/subjects/humour/11.html
52  http://quoteland.com
53  http://www.brainyquote.com/quotes/quotes/g/georgebern125582.html
55  http://www.is.wayne.edu/drbowen/CRTVYW99/amabile.htm
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Henry is the Executive Director of The Art Costa Centre For Thinking. The centre promotes teaching for thinking through staff development workshops, conferences and students programs. Henry is one of very few Asian trainers identified by Professor Costa to conduct staff development workshops. In addition he is the only Buzan Master Trainer for Asia. After graduating with honours in Engineering (and later a Masters of education), he has served at the Monetary Authority of Singapore in policy formulation and execution work. He also spent some years in Shell, Standard Chartered Bank as well as OCBC Asset Management, in the area of finance and investments.

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