HOW TO SUCCEED IN SCHOOL AND UNIVERSITY

A GUIDE FOR PARENTS AND STUDENTS

By Michael Petty, PhD

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About the Author

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He has a BA from Durham University, UK
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After National Service in the British Army where he was a marksman, and a stint as a pilot in the RAF, Michael was a professor and senior lecturer. He taught and carried out research at the Centre for Educational Research at the University of New South Wales, the University of Calgary and the University of Wisconsin-Madison.

Michael was a Canada Council Doctoral Fellow and held other fellowships including a Shaw Fellowship at the University of Wisconsin-Madison. He also achieved a 4.0 grade point average. He is the author of over thirty papers and books and numerous articles in professional journals.

Michael is the CEO of TASK Research in Australia and chairman of Lanka Statistics and IT Research (Pvt.) Ltd, an international company based in Colombo, Sri Lanka. He was principal of S.M.A.R.T Research in Australia.

Michael is a social psychologist and applied statistician.

* The cover photo shows Diluni, a statistician who developed a conjoint analysis package which is available on-line. That is a huge international achievement. Diluni comes from a rural area of Sri Lanka and she studied at rural schools and a rural university. Diluni is studying for an MsC. She uses brainwave entrainment.

Contents

This e-book helps students to achieve success in school and university.

It dispels the myth that some people are born no-hopers, as Australians say.

We show that everyone can achieve success in school and we show students and the parents of students how to foster high levels of achievement.

Myths about Teaching and Learning

Surprisingly, a lot of educators know little about learning. And when they do, what they know does not always find its way into schools.

An example: people have believed for at least half a century that a foreign language is best learned at a young age. Yet in schools in the USA and Australia a foreign language was not taught until high school. This seemed counterproductive if not outright stupid. Now evidence starts to emerge that perhaps we had no idea of when it is best to teach languages.

New research shows:

> It is a common belief that younger children learn second languages more easily and more rapidly than both adolescents and adults. Implicit in decisions to lower the age of first instructional exposure to an additional language is also the belief that the greater the number of years of academic study devoted to foreign language learning, the better the outcomes.
> However, there is surprisingly little research evidence to support these beliefs. **…** Research is therefore needed to inform policy makers of the respective advantages of an early start and different time distributions as well as of the different ways in which age may affect proficiency.[1]

[1] Carmen Muñoz, Laura Collins, Joanna White, Mia Victori Blaya, Maria Rosa Torras Cherta, Teresa Navés, Luz Celaya *Age, intensity of instruction, and metalinguistic awareness in EFL learning*, http://www.tirfonline.org/Munozetalreport.pdf (extracted 16th September 2010)

Perhaps foreign language instruction in US and Australian schools was based on misinformation. Chances are that it still is.

Unfortunately a lot of educational practices are based on myths and fads. New theories about teaching and learning spring up like mushrooms after rain.

What we aim to do in this e-Book is to reveal some of the more pervasive myths and to provide real information based on good research.

Robert A. Bjork, a psychologist at the University of California, Los Angeles, speaking about current research into learning says:

> "We have known these principles for some time, and it's intriguing that schools don't pick them up, or that people don't learn them by trial and error … Instead, we walk around with all sorts of unexamined beliefs about what works that are mistaken."

It is particularly distressing that so many educators are misinformed about learning. This makes it very difficult for students to know how to succeed in school. We are all students, and some of us are parents of students, at some time in our lives. We need to know more about how to learn effectively.

Our goal in this e-Book is to provide parents and students with solid information on how to succeed in school and university.

Student Motivation

Washington Post economics columnist Robert Samuelson asked why America has spent so much money on school reform and yet has so little to show for it. The answer he said lies not necessarily with schools and teachers, rather:

"The larger cause of failure is almost unmentionable: shrunken student motivation, … The unstated assumption of much school 'reform' is that if students aren't motivated, it's mainly the fault of schools and teachers." Wrong. "Motivation is weak because more students (of all races and economic classes) don't like school, don't work hard and don't do well."

It is easier for politicians and policy makers to blame teachers than to blame parents or students.

How Motivation Overcomes Disadvantage

One cause of student failure, then, is poor motivation. Fortunately cognitive science can help develop motivation.

Years ago a friend and colleague at the University of New South Wales, Dr. Phil Mead, did some interesting research that showed that the children of non-English speaking immigrants to Australia performed better in school than their native-born Australian peers. The way Dr Mead explained this was to hypothesize that immigrants are more highly motivated to succeed than others, which is why they take the major leap into the unknown that immigration implies, severing ties with all they knew and left behind them.

Immigrants passed their motivation on to their children, Dr Mead postulated, and it was this high motivation that enabled them to overcome disadvantages such as low social status and their parents' lack of an English language education. And this motivation was great enough to propel them well beyond what their teachers expected of them. It was ambition and motivation, not greater intelligence, which propelled these children from immigrant families to achieve in school and university at a level beyond their native-born Australian peers.

There is a great deal of evidence that parents' attitudes and support and encouragement have more impact on students' performance in school than any other factor, including IQ and teacher aptitude.

The Secrets of Success in School

Research shows that you can beat the odds. In the USA, Canada and Australia Asian students outperform others as if they had an IQ advantage of 10 points, though of course they do not. What is their secret? The answer can be expressed in four words: ambition, confidence, hard work. It is the ambition that drives the hard work. It is confidence that makes the hard work successful.

- You must *want* to succeed, and
- You must know that you *can* succeed.

How Parents can Help Their Children Succeed in School

Education is important; it is a major determinant of life chances. But education is not a given, parents can do much to foster educational achievement in their children.

- First parents need to know that every child has the potential for educational success. Your children almost certainly have the ability to succeed in school. There are common stereotypes about educational achievement that are false, such as that girls are not as good at mathematics or science or engineering as boys, or that the daughter of a single mother who works as a hospital cleaner cannot aspire to become a brain surgeon.

These stereotypes are dangerous myths and as a parent you have to examine whether you believe them. If you do believe them you need to re-examine your beliefs. Social class is a better predictor of performance in school than IQ; this is because working class parents and teachers believe that working class children are less likely to succeed in school than middle class children.

But Asian children in North America and Australia succeed in school not because they are intellectually or socially superior to Americans, Canadians or Australians of European origin, but because they are more highly motivated to succeed. It is the motivation and the belief that they can succeed that result in them topping university entrance exams and university courses year after year. And the motivation is provided by their parents.

As Professor Phil Mead showed in Australia, the children of non-English speaking immigrant parents perform better in school than their native Australian peers despite the fact that they are from disadvantaged working class families, because they inherit their parents' will to achieve.

Teachers often, unfortunately, propagate the myth of working class disadvantage, giving working class or minority children in their care the idea that they should not aspire to higher occupations.

I knew this in theory but I came across it face to face when I went with my family to Australia to teach at university. At first, my son attended a working class school and his teacher, assuming he came from a working class background similar to that of the other students in the school, advised him that his career aspirations should not include anything higher than a trade or driving a truck. I went and had words with that teacher. Our son went on to win a university medal.

There are role models such as President Obama which show that such stereotyping is wrong. Introduce your child to appropriate role models – you do not have to like President Obama to present him as a role model, he is an African American from a single parent family who became a Harvard professor and president against the odds. Your child too can beat the odds, with your help.

- **Parents need to foster a winning attitude in their children.** They have to convince their children that they can succeed. It is the subconscious mind that needs to know this and the subconscious mind is negative and difficult to access. There are certain principles that derive from mental programming that should be followed in encouraging your child:

- **Provide role models for educational achievement.** You, your child and his teachers must not think that working class, African, Hispanic, or poor children cannot succeed in school. This is untrue. There are plenty of people from disadvantaged backgrounds that have achieved in school against the odds. Look for such role models.

- **Make goals realistic.** Encourage your child to aim for the top ten percent of his or her class in mathematics, not necessarily for the top position.

- **Ignore the problem – focus on the solution.** Do not for instance say 'you must not watch TV while doing homework'. Avoid negatives, be positive; say 'do your homework in a place free of distractions', and name that place. Set aside an area where the child can do homework free of the distractions of TV.

- **Repetition.** Advertisers know the value of repetition. Repeat your mental programming even after the rules seem to have been learned, this will reinforce desirable behaviors and attitudes.

- **Keep it simple.** Do not try to achieve everything at once. And keep your instructions and advice simple, simple words will be processed more rapidly by the subconscious mind.

- **Belief and confidence.** Believe in the abilities of your child and yourself and have confidence in them. The human mind is infinitely powerful and it has few limitations. If you have confidence in the ability of your child to achieve then you will instill that confidence in your child also, and your child will achieve what he or she believes he or she can achieve.

- **Hire a tutor if you feel you must.** If you can afford a tutor then it may be a good thing to hire one, but it is probably not necessary as long as your child has the learning materials they need. And having a tutor may give your child the idea that they are less than competent, otherwise why do they need a tutor?

- **Meditate.** Learn meditation with your children, it will benefit both you and them. Meditation improves mental focus and thinking in general. Meditation is made easier with brainwave entrainment. It also improves general health.

- **Use brainwave entrainment technology.** Brainwave entrainment technology is surprisingly inexpensive and there is plenty of university research to show that it works. It is also simple to use. Your child sits and studies while playing the appropriate mp3 track on headphones or speakers. Brainwave entrainment technology, including will enhance the learning experience. Brainwave entrainment can also help with meditation. There is no risk to you, the products are guaranteed.

What is Intelligence?

Often when people think of intelligence they think of IQ, but IQ is not intelligence, it is supposedly a measure of intelligence. IQ is short for Intelligence Quotient and in the early days of IQ testing if you asked a psychologist what IQ tests measure they would respond with "IQ tests measure intelligence". Nowadays psychologists are more likely to say: "IQ tests measure what IQ tests measure" or perhaps "IQ tests measure IQ".

At best IQ is a measure of performance, but it is a very poor measure. Howard Gardner has devoted his career as a psychologist to the study of intelligence. Gardner defines intelligence as 'the capacity to solve problems or to fashion products that are valued in one or more cultural settings'.[2]

Clearly intelligence is a capacity or potential to perform, that capacity may be measured, though imperfectly, in terms of IQ or academic tests, college admission tests, and so on.

Howard Gardner is best known for his work on multiple intelligences. The theory implicit in psychometric testing, is that intelligence is a single entity, that it results from a single factor, and that it can be measured simply via IQ tests. Gardner, however, has devoted a career in psychology to exploring the idea that there are multiple intelligences, not a single underlying factor.

According to Gardner's latest formulation there are seven kinds of intelligence, they are:

Linguistic intelligence, logical-mathematical intelligence, musical intelligence, bodily-kinesthetic intelligence, spatial intelligence, interpersonal intelligence - understanding other people, and intrapersonal intelligence, which is understanding oneself.

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[2] Howard Gardner, & Hatch, T. (1989). Multiple intelligences go to school: Educational implications of the theory of multiple intelligences. *Educational Researcher*, *18*(8), 4-9.

Whether Gardner is right and there are seven forms of intelligence is debatable, and this is not a new debate. At the beginning of the twentieth century London University Professor Charles Spearman studied the nature of intelligence. At the time there was debate among scholars as to whether there is one general underlying factor in intelligence or whether intelligence consists of a number of factors, similar to some of those postulated by Howard Gardner. The single underlying factor theory won out in the IQ debate and is embodied in IQ. This led to the IQ fallacy.

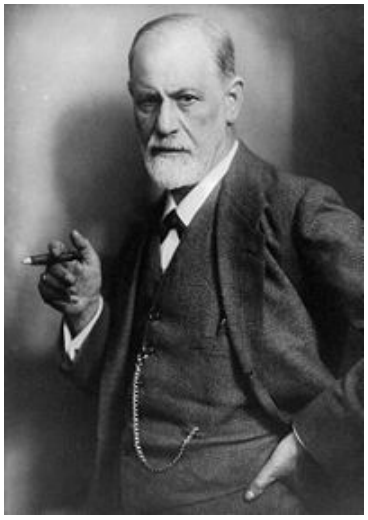
There is a new IQ debate. Howard Gardner is one of the participants, Daniel Goleman is another. Gardner is concerned with what might be called intellectual IQ; Goleman is concerned with what he calls emotional intelligence.

Emotional Intelligence

In his groundbreaking book *Emotional Intelligence* Daniel Goleman explores recent findings in neuroscience[3].

Goleman asserts that the thinking brain grew from the primitive emotional brain: this, he says, reveals much about the relationship of thought to feeling; there was an emotional brain long before there was a rational one. (Goleman p.11) This is something like what Freud also said.

The Id and the Ego



Id, ego, and *super-ego* are the three parts of the psychic apparatus defined in Sigmund Freud's structural model of the psyche. Freud may be somewhat passé now, but the model is a useful one. According to this model of the mind, the uncoordinated instinctual trends are the id; the organized part of the psyche is the ego. These constructs are functions of the mind and do not necessarily correspond to structures of the brain, which are the concern of neuroscience.

[3] Daniel Goleman, ***Emotional Intelligence***, New York: Bantam Books, 1995

Freud said of the id:

It is the dark, inaccessible part of our personality, what little we know of it we have learnt from our study of the dream-work and of the construction of neurotic symptoms, and most of this is of a negative character and can be described only as a contrast to the ego. We all approach the id with analogies: we call it a chaos, a cauldron full of seething excitations...

In Freud's formulation the id is a more basic part of the mind than the ego; thus the psyche is, at birth, an undifferentiated id, part of which then develops into a structured ego. The id:

"

> contains everything that is inherited, that is present at birth—above all, therefore, the instincts, which originate from the somatic organization, and which find a first psychical expression here (in the id) in forms unknown to us" Freud, (1933) *New Introductory Lectures on Psychoanalysis*

The id holds the basic drives, and from the perspective of neuroscience is the powerful unconscious mind that regulates our unconscious functions such as breathing, heartbeat and digestion. We shall henceforth refer to Freud's Id as the unconscious mind. Breathing is the only unconscious function that we can easily access consciously, which is one reason why it is so effective in meditation to focus on the breath.

Focus on the breath in meditation gives some access to the normally inaccessible unconscious and it may well be that the pains of the first stage of a meditation retreat are occasioned when focus on the normally unconscious breath brings the id/unconscious mind to the surface.

"

The unconscious mind is responsible for our basic drives such as those for food, water and sex; it is home to our basic impulses. The unconscious mind is amoral, totally selfish, concerned only with pleasure and pain. The unconscious mind has no sense of time, it is completely illogical, sexual, infantile in its emotional development, and is not able to take "no" for an answer. The unconscious mind is regarded as the home of the libido.

The mind of a psycho/sociopath never develops beyond the unconscious mind, which is why sociopaths remain completely self-centered asocial people, entirely lacking in conscience even into adulthood. They are singularly focused on getting what they want for themselves and do not care at all about the cost to anyone else. In this they are pure unconscious mind.

The unconscious mind is enormously powerful, as Freud said:

...The ego is that part of the id which has been modified by the direct influence of the external world ... The ego represents what may be called reason and common sense, in contrast to the id, which contains the passions ... in its relation to the id it is like a man on horseback, who has to hold in check the superior strength of the horse.

The sociopath does not develop a functioning ego and though many of them learn to behave superficially as social beings they cannot sustain long-term relationships even with family.

As Freud's parable of horse and rider suggests the unconscious mind is passionate and more powerful than the ego. The reason why smokers have so much difficulty quitting and fat people stopping snacking is that the unconscious mind demands the pleasures of smoking and food.

Though the more rational ego knows that smoking is self destructive and that obesity kills it has little chance of imposing its will to quit upon the unconscious mind because the unconscious mind is powerful and emotion over-rides reason every time. If the unconscious wants to smoke then it will be very difficult to quit, even though the rational conscious mind desperately wants to.

Mister Spock of Star Trek may have been completely rational but he was part Vulcan, humans are not completely rational; the primitive part of our brain ensures that.

The pain of meditation

There were more than sixty people on a Vipassana meditation retreat in Australia's Blue Mountains. It was midsummer in Australia and coming from the tropical north I made the mistake of thinking I would not need warm clothing. My first night was unpleasantly cold but after I got an extra blanket which I also used as a serape things were more comfortable.

In fact comfort was not an objective of the retreat. Our accommodation was simple and we were not allowed to speak, or even look at our fellow

students; for ten days we maintained *noble silence*. This included a total ban on reading materials, telephone, radio and TV.

We also adhered to a Code of Discipline, which was the basic Buddhist code of conduct. We were required to commit ourselves, for the period of the course, to abstain from killing, stealing, sexual activity, speaking falsely, and intoxicants. There were signs warning us males not to look towards the women's quarters. Naturally on seeing those signs one was prompted to look towards the women's quarters.

Our instructor, on video, was Mr. S.N. Goenka, an Indian from Burma who according to his legend was destined to return the true Buddhsit tradition of meditation, Vipassana, to India.

We all sat in a large meditation hall for ten hours a day and meditated. For the first two days we practiced breath meditation; in the remaining days of the retreat we practiced self-observation, repeatedly focusing on our bodies and our thoughts; it was not easy. A few people dropped out on the first day.

Mr Goenka likened the retreat, which he referred to as the 'kindergarten level' of Vipassana to brain surgery and in a sense it was; we learned to observe the workings of our mind. And as is the case in surgery there was pain, without anesthetic, which Goenka-Ji also warned us to expect during the first two days of the retreat.

There was the physical pain of sitting with legs crossed which became trivial after a while. There was also emotional pain.

In the train returning to Sydney a group of us talked about our experiences on the retreat. One of them was a young British dot-com millionaire. He said that on the second day he had gone into the communal dining hall at lunch time and had burst into tears. Because he did not want to be seen crying he went out onto the balcony.

Another of us had spent two years in Japan learning kendo. He was formidably fit and his pain manifested itself physically. He said that the pain he felt was worse that the pain when he had broken an arm.

It seemed that the emotional pain we felt in the first two days was a result of gaining access to our unconscious mind through rigorous meditation ten hours a day.

As we talked it seemed that this pain in the first two days was a universal experience. We also agreed that the Indian chants with which Goenka-Ji introduced some of his meditations were pretty horrible, that the vegetarian food had been excellent and that the whole ten-day experience had been most valuable.

Brainwave Entrainment Gives Access to the Id

When we meditate we enter an Alpha brainwave state. Experienced meditators may even get down to the slower theta brainwaves. Theta is called the hyper-suggestible state. As our experience of the initial pain of meditation shows the subconscious is accessible in alpha. The subconscious it is more accessible in Theta but Theta is hard to achieve through meditation alone and is usually achieved only by adepts, those of us who are not monks are unlikely ever to achieve the higher meditative states.

Suggestions made when the brain is in Theta bypass the critical filters of the mind; since the brain in Theta is in a childlike state it accepts suggestions that it would reject in a higher brainwave state such as the wide-awake Beta.

Brainwave entrainment allows us to enter Alpha and Theta relatively easily. Brainwave entrainment makes the benefits of meditation in controlling the unruly id readily accessible to nearly everyone. Brainwave entrainment is the fast track to meditation for those of us who are not monks or nuns.

IQ and achievement

Goleman says in his book *Emotional Intelligence*, that IQ contributes about 20 percent to the factors that determine life success … As one observer notes, “The vast majority of one’s ultimate niche in society is determined by non-IQ factors, ranging from social class to luck” (Goleman p. 36)

The IQ test, developed by Lewis Terman at Stanford … led to what psychologist Richard Gardner calls the “IQ way of thinking”: “that people

are either smart or not, that there's nothing much you can do about it, and that tests can tell you if you are one of the smart ones or not. The SAT test for college admissions is based on the same notion of a single kind of aptitude that determines your future. This way of thinking permeates society". (Goleman p. 40)

Every now and then I check myself out on Google to see if anybody is reading my articles and I found Petty MF, Field CJ (1980), "Fluctuations in mental test scores", *Educational. Research*, 22(3), pp. 198-202 quoted in the Italian medical/psychology reference: Psicologia clinica (F. Del Corno, and Lang, Margherita (2003) FrancoAngeli, 576 pages)

What Cecil Field and I found was that mental test scores, in this case group Stanford-Binet IQ scores measured over the years for hundreds of grade school students seemed to be remarkably unstable.

We had believed, as Gardner puts it: "that people are either smart or not, that there's nothing much you can do about it, and that tests can tell you if you are one of the smart ones or not". We also thought as other psychologists did, that IQ scores were supposed to be stable over time.

IQ is a very one-dimensional measure of ability or potential to achieve

What we found, much to our surprise, was that IQ scores for these students, from one year to the next were remarkably unstable, with scores in one year correlated on average only 0.5 with scores in the following year.

In our review of the literature for the article which reported our findings, (and which also generated interest from the Bulgarian Institute for Brain Research), we found that the reigning guru of psychological measurement at that time, Benjamin Bloom, felt that a correlation coefficient between IQ scores of 0.5 indicated stability.

But a correlation of 0.5 indicates that only 25% of a person's IQ score in one year is predicted by his score in the previous year. This finding accords pretty well with Goleman's observation that: "At best, IQ contributes about 20 percent to the factors that determine life success". We found that IQ in one year contributes only 25% to IQ in the year following. So IQ does not contribute much to predicting IQ.

What these studies show is that IQ is a very one-dimensional measure of ability or potential to achieve. As Goleman says, a high IQ is not enough to define intelligence, what is also needed is emotional intelligence, the social skills and motivations that propel someone with a high IQ to high levels of achievement. Intellectual IQ alone is not enough and in many spheres of achievement in business, careers and life a high intellectual IQ is no guarantee of great success.

What the work on IQ also implies is what neuroscience is rediscovering now, and that is that the brain is plastic. It responds like a muscle does to exercise. New neural pathways can be burned at any time in life. You may not have the ability to become a world class skier at age 60 if you have never skied before, but you can learn to ski at age 60.

Summary

IQ is a very limited and one-dimensional notion of intelligence. IQ is not a good predictor of success in life. Our study was one of the first to show that IQ is also not fixed; IQ scores can be improved.

A better predictor of success in life is *emotional intelligence*. This is the motivation and drive to achieve that is located in the primitive, emotional, unconscious brain. The unconscious mind is powerful, it never sleeps and it gets what it wants. It is the unconscious mind that will provide the impetus to study and succeed. Develop your emotional intelligence.

Brainwave entrainment gives access to the unconscious mind through mental programming, through self hypnosis. If you want to enhance your learning experience or your motivation to learn use brainwave entrainment, it works, unlike subliminal learning, and has no undesirable side effects.

The IQ Fallacy and Psychological Fraud

Sir Cyril Burt was Britain's leading psychologist. A powerful man in his domain, he could make or break careers in psychology. He was also a liar and fraud who propagated an IQ fallacy that bedeviled British schools for half a century.

Sir Cyril claimed to have identified three types of human being, an intellectual elite that made up a minority of about 20% of Britain's children, a practical group that was vocationally-oriented and occupied the intellectual middle ground, and a majority who could be expected to attain little more than basic literacy and numeracy in school.

Sir Cyril's findings provided a blueprint for Britain's schools. Given that he said he had discovered three intellectual capacities, the school system that Sir Cyril inspired was the 'tripartite' system.

In practice it soon became a bipartite system since the middle ranking vocational schools never developed. What was left were the grammar schools for the 20% of Britons who made up the intellectual elite and the secondary modern schools for children who could be expected to learn little more than basic literacy and numeracy.

There was an exam that students took at the end of their common elementary schooling called the 11+, since that was the age at which it was taken. This exam separated the sheep from the goats (and the donkeys). Children in the top 20% of the 11+ exam might go on to a grammar school but the rest went on to a secondary modern school. This system stifled 80% of Britain's talent. The 11-plus exam was based on the concept of the IQ test.

Only grammar school students ever qualified for entry to university. Secondary modern students were condemned at age 11+ to a life in which the highest achievement they could realistically aspire to was to be a tradesperson, a carpenter, an electrician or a hairdresser. None of them could aspire to go to university. And their life chances were decided when they were eleven years old!

The British system of selective schooling was quite different in its underlying philosophy from the comprehensive US system which is based on the idea that children are born approximately equal in their abilities. The British system did have its roots in the class system though. Britain is the only developed nation that has retained a hereditary aristocracy with real social standing.

Of course the USA had segregated education for blacks and whites, which was just as bad. Clearly the British system was grossly unfair because it condemned a majority of children to a life of very limited opportunities.

Research shows that ***all*** children can easily be trained in the skills needed to score high marks in academic tests

Burt's IQ studies are flawed in their scientific method, but their greater flaw is the belief that intelligence is an in-born attribute, and a fixed quantity, essentially unchangeable.

Undermining the IQ testers' claims to measure general intelligence, research shows that all children can be trained in the skills needed to score high marks in academic tests as long as their measured IQ is within a range that fits 97.5% of any human population.

US psychologist Leon Kamin showed that Burt's figures were a statistical impossibility. Kamin described Burt as 'a liar and a fraud'.

Kamin's charge was further supported when it was found that Burt's two female research assistants, who he said had collected and processed his data, had never actually worked with him. In fact nobody ever found them!

Burt's study gained authority because of the large number of twins he claimed to have found, and because he asserted that there was little similarity between the social circumstances of the families that raised the separated twins.

On the face of it this seems unlikely and, in the two other prior studies of this kind, twins supposedly separated at birth were not raised apart at all. They were raised by members of the same extended family. They played together and went to school together.

No doubt Sir Cyril believed that people were born with three types of intellectual capacities. But the fact that he had to fabricate evidence for his 'research' indicates that the hypothesis of three different innate levels of intellectual capacity is not in fact tenable. It seems that the American notion that "all men (and women) are born equal" is closer to the truth, even if America did not actually treat blacks equally to whites until the Supreme Court insisted on implementing the Constitution and integrated public schools.

In fact social class is a better predictor of academic achievement in school than IQ. All current evidence leads to the conclusion that any 'normal' child, that is a child that is not brain damaged in some way, can realistically aspire to go to university and that when they get there they can do well.

Asian students in the USA, Canada and Australia outperform other groups in school. This is not because they have a higher IQ than other ethnic groups, they do not; it is because they have greater motivation and ambition. They work harder.

The fact that so many children do not go on to higher education in any country is a waste of national resources. We abhor Islamic societies that do not allow women to get an education but we do the same thing with the children of the poor. We are wasting a great national resource by excluding these groups from access to higher education.

You must be smart, you think just like me

In feudal times it was God, or at least the Church, that enforced the social order. It has, after all, always been in the interests of the elite to maintain a social order in which they rule and have access to most of society's resources. The priests helped maintain the social order in exchange for a high place in it.

With the decline in organized religion in the twentieth century IQ was invented and this became the way to maintain the social order. IQ tests are used to allocate students to university. It is no coincidence that IQ tests reflect the social order. After all the people who make up the IQ tests are from the educated middle class. What they are saying to others who score high on IQ tests is "You must be intelligent, you think just like me".

The values that are reflected in IQ tests are those of the middle class. It is no coincidence that working class children and adults do not perform as well in IQ tests as children from the middle class.

When I taught at university in the USA I used to administer the Chitlin' IQ Test to my white American students. The Chitlin' IQ test was designed for the black ghetto. Typically Blacks would perform well on it and Whites would score about 70, which would make them mentally challenged or educationally subnormal if the values and curriculum of the school were those of the ghetto.

There is also evidence that intellectual IQ has no more than about 20% impact on learning outcomes. The rest is determined by motivation, application, social class and luck.

Do not allow yourself or your children to be put in a box labeled 'low achiever' or 'low IQ'.

Any human brain has almost infinite capacities. Most of us do not realize our capacities because we have been convinced, and have convinced ourselves, that our capacities are limited. Do not accept that your capacities are limited, they are not.

Summary

Intelligence is not an innate attribute, nor is it a fixed quantity. Students can take heart when other people, and even their schools, try to tell them they do not have the intelligence they need to succeed in school.

Britain is not the only nation to base a whole educational system on the IQ fallacy. Any society that has evolved from a feudal state where a monarchy and an aristocracy are born, and ordained by God to rule, harbors a lingering assumption that people are born with different capacities. In modern societies this translates into the IQ fallacy that intelligence is innate and that nothing can be done to change a person's IQ.

Individual IQ can be boosted and learning enhanced in many ways. Do not allow the IQ fallacy to keep you down.

As Peter Orszag says:

> The most important book I've read over the past six months is Matthew Syed's "Bounce."[4]
>
> Too many of us believe in the "talent" myth — that top performers are born, rather than built. But Syed shows that in almost every arena in which tasks are complex, top performers excel not because of innate ability but because of dedicated practice.

Your brain is almost infinitely powerful. If you believe you can achieve and you dedicate the time to learning, and you follow productive study habits then there is no limit to what you can achieve. Believe it.

[4] Matthew Syed (2010) *Bounce How Champions Are Made,* Harper Collins

The Human Brain is More Powerful than a Computer

We tend to think of computers as being more powerful than the human brain because they process information very fast indeed. I just Googled "computers" and got about 1,520,000,000 results in 0.07 seconds. This is on a simple desktop PC, and not a particularly powerful one.

IBM's Blue Brain can handle over 20 trillion operations a second.

We cannot even begin to imagine our brains working at that speed and yet computers really have little processing power compared to the human brain.

Project Blue Brain

The IBM project Blue Brain is a supercomputer engineered to emulate the mammalian brain. It is the size of about four refrigerators. Blue Brain can handle over 20 trillion operations a second.

Sounds impressive? It is. By the end of 2007 Blue Brain had simulated one column of the neocortex of a rat with 10,000 neurons and 30 million synapses. However, a human neocortex column has 60,000 neurons and of course the human neocortex is far larger than that of a rat and there are far more columns.

Blue Brain still has a long way to go before it even comes close to the power of a rat brain. And the human brain is not only very much more powerful than Blue Brain it is also very much more efficient than Blue Brain The human brain is very much smaller and requires far less power to operate than Blue Brain.

Differences Between Brains and Computers

Some of the following comes from *Ten Important Differences between Brains and Computers*, some is mine, see:
http://scienceblogs.com/developingintelligence/2007/03/

One important difference is that the brain is a massively parallel thinking machine; computers are modular and serial. The brain processes information

in parallel, it relates ideas between different parts of the brain whereas computers process serially seeking information from defined addresses in its memory. The human brain is far more flexible than a computer.

Unlike computers, processing and memory are performed by the same components in the brain. Computers process information from memory using central processing units - CPUs, and then write the results of that processing back to memory. No such distinction exists in the brain. As the neurons of the brain process information they modify their synapses. Human brains restructure themselves as they think, enabling them to grow. Brains learn, even animal brains, even bird brains, computers do not learn.

Brains have bodies. Brains take advantage of the fact that they have sensory inputs from bodies. A series of experiments by Jeremy Wolfe showed that even after being asked hundreds of times which simple geometrical shapes are displayed on a computer screen; human subjects continue to answer those questions by gaze rather than rote memory. In other words the human brain is too smart to bother to remember things it can easily check out just by looking.

The brain has much, much more processing power than any current computer.

> Accurate biological models of the brain would have to include some 225,000,000,000,000,000 interactions between cell types, neurotransmitters, neuromodulators, axonal branches and dendritic spines, and that doesn't include the influences of dendritic geometry, or the approximately 1 trillion glial cells which may or may not be important for neural information processing. Because the brain is nonlinear, and because it is so much larger than all current computers, it seems likely that it functions in a completely different fashion. The brain-computer metaphor obscures this important, though perhaps obvious, difference in raw computational power.

Many scientists involved in the development of artificial intelligence now believe that AI will not develop until far into the future, if ever. This is not to say that we should abandon the idea of a computer developing intelligence, that would be foolish. Too many forecasts about science in the past have been very wrong.

There is a recurring theme in fiction that computers will reach a critical mass and suddenly be able to think. In fiction the computer becomes

malevolent and god-like, just like Hal in 2001, A Space Odyssey. We are well past 2001 but no such happening is close as yet.

Computers are Useful Tools

I do almost all my work on computers since a lot of what I do is write, which requires word processing, and statistical analysis which requires large scale mathematical operations.

Most of the statistical analyses I do are multivariate and involve the inversion of matrices. I remember being told by a professor that graduate students were employed in the Great Depression to invert 10x10 matrices and that it took a student 6 months to invert one matrix.

The matrices I invert using a PC nowadays are generally bigger than 20x20 and yet they take only milliseconds, not years, to invert. So I have a great deal of respect for computers and rely on them almost entirely for my work, most of which takes place on-line.

Brains Can Think

The most basic difference between brains and computers is that the human brain can think, but a computer cannot. What does this mean? Basically computers and the human brain are different, they are structured differently, they 'think' differently. The difference is illustrated very aptly by this passage that I found at www.businessballs.com

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We can read this, a computer cannot. That flexibility illustrates the major difference between a human brain and a computer.

Alan Turing, a British mathematician who broke German codes during World War II, developed the Turing Test for artificial intelligence. According to Turing a computer could be said to think if it could fool an interrogator into believing that a written conversation was with a human. See also the **CAPTCHA** test on the Internet.

It will be some time before a computer passes the Turing Test.

Never think that you cannot be a success in school. You have a remarkable brain and if you use it to your full potential then you can achieve just about anything.

Summary

You have an enormously powerful tool in your brain. The limits of the human brain are unknown. It is the most powerful computer in our universe.

There are great thinkers in every generation that show just what the human mind can achieve, the Buddha, Plato, Shakespeare, Goethe, Voltaire, Newton, Einstein. You may not be the next Einstein, there are limited opportunities at the top, but there is no reason why you cannot be a world class intellect. The only limitations on your mind are the limits you impose on yourself or the limits you allow other people to impose on you.

There is no Limit to What You Can Achieve

In an Opinionator article in the New York Times (September 9, 2010) Peter Orszag writes:

> The most important book I've read over the past six months is Matthew Syed's "Bounce."[5]
>
> Too many of us believe in the "talent" myth — that top performers are born, rather than built. But Syed shows that in almost every arena in which tasks are complex, top performers excel not because of innate ability but because of dedicated practice.

There can be no doubt that Syed, a ping pong Olympian, has made a very valuable contribution to the literature on achievement. There is a lot of effort invested today in trying to sell easy solutions to every social problem, particularly in what Google CEO Eric Schmidt characterized as the 'cesspool' of false information that is the Internet.

You can aspire to learn a language, subliminally while listening to music or asleep, or to make $650 an hour in your spare time, working from home. But subliminal learning is a myth and easy money offers that look too good to be true are.

There are rarely easy solutions, if there were we'd all be millionaires. As a wise man said, there is no such thing as a free lunch, but there are thousands of people out there on the Internet who will try to sell you a free lunch.

People spend an estimated $50 million a year on subliminal learning materials and yet they don't work. People want success but few are prepared to put in the effort that success requires.

Peter Orszag says that "it seems plausible that many more people than commonly believed have sufficient innate skill to perform at world-class levels in complex fields with sufficient practice".

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[5] Matthew Syed (2010) *Bounce How Champions Are Made,* Harper Collins

I agree with this statement, particularly with respect to education. The IQ fallacy says everyone is born with a limited potential. But research shows that 97.5% of the population has the ability to achieve excellent results in school and college if they apply themselves.

However I do not believe that *everyone* can achieve excellent results in *anything*. Even if I had started practicing at age 5 for 8 hours a day I would never have become a basketball star: I am not tall enough.

The IQ Fallacy

Matthew Syed's book does much to combat the IQ fallacy, which has held so many people back for so long. The development of IQ testing led psychologists to believe in what Richard Gardner calls the "IQ way of thinking", which is that

- we are all born with a given amount of intelligence,
- there's nothing anyone can do to change this native endowment,
- IQ and other educational tests can tell you if you are one of the smart ones or not.

None of these things is true, yet a huge educational testing industry developed in the twentieth century to sort people into the groups – professions, trades, unskilled workers – that determine life chances. Unfortunately IQ and educational tests are poor predictors of achievement.

People followed their parents' lives in the past; and they still do. The Victorian hymn *All Things Bright and Beautiful* sums up the situation: "*The rich man in his castle, the poor man at his gate, God made them high or lowly and ordered their estate*."

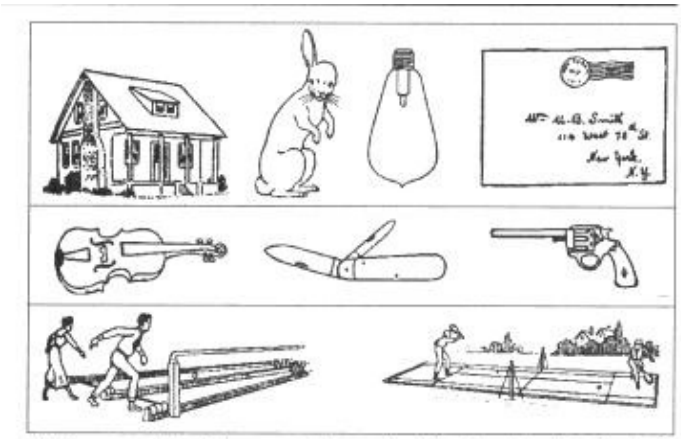
There was no chance that the son of the poor man would ever become lord of the castle or the son of the lord ever become a beggar. The Church helped maintain the Victorian social order that God ordained to keep the rich man in his castle. There is more social mobility today than in Victorian times but the educational testing industry and schools and colleges and universities have largely taken over from the Church in doing God's work to keep people in their places.

Recent research suggests that Britain and particularly the United States have less social mobility than the Nordic countries and Canada[6]. There has been a decline in social mobility in both Britain and the USA and the decline has been greater in the USA. The authors of this research state that "the idea of the US as 'the land of opportunity' persists; and clearly seems misplaced".

Americans did not become wealthier during the Bush II years, and this was the first time since World War II that there has been no economic growth. When there is no enrichment then there is little room for upward social mobility. The Horatio Alger myth is now just that, a myth.

IQ was designed to measure intelligence, but there has been a great deal of debate as to what IQ really measures.

Sociologists argue that IQ measures aspects of socialization and that cultural bias in IQ tests negates their use across cultures. Ask a psychologist what IQ tests measure today and they may reply as one we know did: "IQ tests measure what IQ tests measure".



Intelligence was claimed to be measured by correctly spotting the missing parts of each of these pictures. However, the cultural bias was ignored—if you had never seen a bowling alley or tennis court, how could you know what was missing?

Items from an IQ test are shown here. The person with high IQ is expected to be able to identify missing items in the pictures. It is clear that many people will never have seen a bowling alley, a revolver, a violin, a tennis court or a rabbit. There is cultural bias in these items.

[6] Jo Blanden; Paul Gregg and Stephen Machin (April 2005). "Intergenerational Mobility in Europe and North America" (PDF). The Sutton Trust. http://www.suttontrust.com/reports/IntergenerationalMobility.pdf.

The Brain is Plastic

Petty and Field[7] showed years ago that IQ test scores can and do change. They are by no means immutable, in children or adults. Our research was based on a survey of the test scores in mathematics, IQ and English of over 200 grade school children over a period of four years. What we found was that the performance of individual children varied, in some cases quite dramatically, over this period of time.

In other words we showed that cognitive skills, as measured by standardized English, math or IQ tests could not meaningfully be described as stable, even in adults. The "IQ way of thinking" is false: Children can in fact improve their IQ and so can adults.

Neuroplasticity is the hot new topic in neuroscience. Many studies have shown that the human brain is plastic, that it reacts to new stimuli by building new neural pathways. Research shows that the brain of an expert, such as a chess player, a taxi driver or a musician, is functionally and structurally different from that of a non-expert.

Generally to be a world class chess player, golfer, anything, you need to start young. People that are older can develop or improve skills, but they will never regain the mental dexterity of the young. Part of the reason for that, as neuro science tells us, is that young children have about twice as many synapse connections between the neurons of the brain than adults. This allows for a wide range of possibilities for information transfer in children.

Connections that are unused eventually atrophy, degrading the ability to learn/master that skill later in life. However all is not lost. Adults can learn complex things, as thousands of graduate students do.

We also know that unlike adults, young children are in an alpha or theta brainwave state much of the time and that these states are conducive to learning. However, with brainwave entrainment adults too can be helped to learn more easily.

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[7] Petty MF, Field CJ (1980), *Fluctuations in mental test scores*, Educational. Research, 22(3), pp. 198-202

There is no short cut to success, as Matthew Syed says repeated focused practice is necessary for success in education as in other areas. But repeated focused practice ***will bring success***. There are no innate barriers to success in most people, contrary to what the IQ fallacy would have us believe.

Fortunately neuro science has shown that there are ways in which focused practice can be made more effective through brainwave entrainment. Play an appropriate brainwave entrainment soundtrack while you study and you will learn more effectively.

It is not just necessary to study however, it is necessary to dedicate yourself to your studies.

Stanford psychologist Carol Dweck suggests 'mindset' plays a crucial role in sustaining the necessary type of intense practice. Dweck believes that there are two mindsets, a fixed mindset that reflects the IQ way of thinking that you either have the ability or you don't and what she calls a 'growth mindset' which believes that success follows not from innate characteristics but is the result of effort.

Why are some people more highly motivated to make the effort to study even when studies do not seem to be going well? The answer probably lies in confidence and motivation and here again neuroscience can help. Brainwave entrainment can be used in mental programming – that is self hypnosis - to develop confidence and motivation.

Summary

Just about anyone can achieve just about anything at a high level without having to be innately gifted. Certainly the human brain is an instrument with enormous power and brainwave entrainment can help harness this power to help anyone achieve their educational goals.

There is no success without effort but make the effort and you will profit from it.

As Syed and Dwyer suggest we all have the brain power to achieve just about anything. Whether we are high achievers or not depends not on our IQ, it depends on whether we apply ourselves. Repeated focused practice is the key, which means study, study, study.

The objective of this little e-Book is to help you use the enormous mental powers you possess to achieve great grades in school and university.

Learning Styles

Learning styles are the different approaches that different people have to learning. The idea of individual learning styles originated in the 1970s, it has gained undeserved popularity since then.

Learning style theorists believe that each of us favors some particular method of interacting with, and processing information. This led to the proposition that teachers should assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style.

Not many teachers were persuaded to undertake this impossible task of individualized instruction when faced with a classroom of 30+ students.

Proponents of learning styles claim that tailoring instruction to students' learning styles will allow that individual to learn best[8].

One of the most widely-used models of learning styles is Fleming's VARK model which derived from Neuro-linguistic programming (NLP)[9]. According to Fleming's model, which is quite simple, learners can be categorized as follows:

1. **V**isual learners,
2. **A**uditory learners,
3. **R**eading/writing-preference learners, and
4. **K**inesthetic learners.

Fleming claimed that visual learners think in terms of pictures. So visual learners should be taught with visual aids such as overhead slides, diagrams, bullet point charts, etc. Auditory learners learn best from listening to lectures, discussions, tapes, etc. Reading/writing-preference learners obviously learn from reading and writing and tactile/kinesthetic learners

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[8] Dunn, R, & Dunn, K (1978). *Teaching students through their individual learning styles: A practical approach.* Reston, VA: Reston Publishing Company.

[9] Thomas F. Hawk, Amit J. Shah (2007) "Using Learning Style Instruments to Enhance Student Learning" *Decision Sciences Journal of Innovative Education*

prefer to learn via experience—moving, touching, and doing. These students 'learn by doing' projects, experiments and from actively exploring the world.

The idea is that teachers should prepare classes that address each of these areas in order to cater to all student learning styles. In such classrooms students identify their best learning style and choose the learning experience that benefits them the most. The burden of this theory on already over-burdened teachers can only be imagined by the rest of us.

Despite the fact that it is almost impossible to implement in a functional classroom Fleming's theory is relatively simple compared to other learning style models such as those of David A. Kolb[10] and Peter Honey and Alan Mumford[11].

1. David Kolb's model is based on his Experiential Learning Theory (ELT) There are two forms of experience in the model: *Concrete Experience* and *Abstract Conceptualization*, and two related approaches to transforming experience into learning: *Reflective Observation* and *Active Experimentation.* Combining these approaches results in four learning styles: converger, diverger, assimilator and accommodator.

Honey and Mumford's model is an adaption of David Kolb's model. Honey and Mumford adapted Kolb's model for use in the increasingly lucrative field of management education. Honey and Mumford's model is designed for the continuing education of managers in business.

Mark K. Smith is highly critical of Kolb's model and his criticism of the Kolb model is damning[12].

There are many other models of learning styles; you may come across the models of Anthony Gregorc, the *Sudbury model democratic schools* which implement learning without teachers, Chris J Jackson's neuropsychological model and others.

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[10] Kolb, David (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall

[11] Honey, P & Mumford, A, (1982). *The Manual of Learning Styles*. Maidenhead, UK, Peter Honey Publications

[12] Smith, M. K. (2001). *David A. Kolb on experiential learning*. Retrieved October 17, 2008, from: http://www.infed.org/biblio/b-explrn.htm

There are also many macro critiques of learning-style theories.

According to neuroscientist Susan Greenfield learning-style theories are "nonsense", she says that: "Humans have evolved to build a picture of the world through our senses working in unison, exploiting the immense interconnectivity that exists in the brain."

Many educational psychologists say that there is little evidence for the efficacy of most learning style models, and that the models are often based on dubious theory.[13] According to Stahl[14], there has been an "utter failure to find that assessing children's learning styles and matching to instructional methods has any effect on their learning." Guy Claxton has questioned the extent that learning styles such as VARK are helpful, particularly as they can have a tendency to label children and therefore restrict learning.[15]

The following analysis was retrieved from Wikipedia 07 Sept 2010:

> A non-peer-reviewed literature review by authors from the University of Newcastle upon Tyne identified 71 different theories of learning style. This report, published in 2004, criticized most of the main instruments used to identify an individual's learning style. Coffield's team found that none of the most popular learning style theories had been adequately validated through independent research, leading to the conclusion that the idea of a learning cycle, the consistency of visual, auditory and kinesthetic preferences and the value of matching teaching and learning styles were all "highly questionable."
>
> One of the most widely-known theories assessed by Coffield's team was the learning styles model of Dunn and Dunn, a VAK model. This model is widely used in schools in the United States, and 177 articles

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[13]Curry, L. (1990). One critique of the research on learning styles. *Educational Leadership, 48*, 50-56.

[14] Stahl, S. A. (2002). Different strokes for different folks? In L. Abbeduto (Ed.), *Taking sides: Clashing on controversial issues in educational psychology* (pp. 98-107). Guilford, CT, USA: McGraw-Hill.

1. [15] "Guy Claxton speaking on What's The Point of School?". dystalk.com. http://www.dystalk.com/talks/49-whats-the-point-of-school. Retrieved 2009-04-23.

have been published in peer-reviewed journals referring to this model. The conclusion of Coffield et al. was as follows:

> *Despite a large and evolving research programme, forceful claims made for impact are questionable because of limitations in many of the supporting studies and the lack of independent research on the model.*

The 2009 APS Critique

The Association for Psychological Science (APS) commissioned a panel of leading psychologists and cognitive scientists to evaluate learning style models. The Panel concluded that:

> "at present, there is no adequate evidence base to justify incorporating learning styles assessments into general educational practice. Thus, limited education resources would better be devoted to adopting other educational practices that have strong evidence base, of which there are an increasing number."[16]

If this were a topic being investigated on the popular TV program *Myth Busters* learning styles would be a myth that has been busted.

The lesson from the learning styles critique is that you should not worry about determining your own learning style, all our brains are similar and they evolved similar learning styles. Forget about learning styles and learn effective study habits.

Summary

Learning style theorists believe that each of us favors some particular method of interacting with, and processing information. This led to the proposition that teachers should assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style.

Proponents of learning styles claim that tailoring instruction to students' learning styles will allow that individual to learn best.

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[16] Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest*, 9, 105-119.

One of the most widely-used models of learning styles is Fleming's VARK model which derived from Neuro-linguistic programming (NLP). According to Fleming's model, which is quite simple, learners can be categorized as follows:

1. visual learners,
2. auditory learners,
3. reading/writing-preference learners, and
4. kinesthetic learners.

All the meta research agrees that The Association for Psychological Science (APS) panel of leading psychologists is correct in concluding that:

"at present, there is no adequate evidence base to justify incorporating learning styles assessments into general educational practice. Thus, limited education resources would better be devoted to adopting other educational practices that have strong evidence base, of which there are an increasing number."

Forget about learning styles, study effective learning strategies.

Effective Learning Strategies

Education is beset by fads. New theories about teaching and learning spring up like mushrooms after rain. Here w**e** examine some of the myths that relate to learning strategies**.**

Washington Post economics columnist Robert Samuelson asked why America has spent so much money on school reform and yet has so little to show for it. The answer he said lies not necessarily with schools and teachers, rather:

> "The larger cause of failure is almost unmentionable: shrunken student motivation, … The unstated assumption of much school 'reform' is that if students aren't motivated, it's mainly the fault of schools and teachers." Wrong. "Motivation is weak because more students (of all races and economic classes) don't like school, don't work hard and don't do well."

One cause of student failure, then, is poor motivation; Samuelson says that the majority of students are slackers. Another major cause of failure is a lack of viable learning strategies for motivated students. Many students, and their parents, just don't know how to study effectively.

There are effective approaches to learning however; cognitive science reveals simple techniques that can increase how much a student learns from studying.

Where to Study

The conventional wisdom has it that one should stay with one study location; this is not true. Cognitive scientists have found that changing rooms for study improves retention.

In a 1978 experiment, psychologists found that college students who studied a list of vocabulary words in two different rooms did far better on a test than students who studied the words twice, in the same room.

The evidence we have is that the brain makes subtle associations between what it is studying and the background sensations it has at the time of study. Forcing the brain to make multiple associations with the same material may give that information more neural scaffolding.

Focus

The conventional wisdom is that one should focus intensely on a single topic, whereas research shows, to the contrary, that varying the type of material studied in a single sitting results in far better learning outcomes than does concentrating on just one skill at a time. Musicians know this; their practice sessions often include musical pieces, scales, and rhythmic work. Athletes mix strength, skill and speed drills in their workout routines.

In a study recently posted online by the journal *Applied Cognitive Psychology*, Doug Rohrer and Kelli Taylor of the University of South Florida taught a group of fourth graders four equations, each to calculate a different dimension of a prism. Half of the children learned by studying repeated examples of one equation, the other half studied mixed problem sets, which included examples all four types of calculations grouped together.

A day later, the researchers gave all of the students a test on the material. The children who had studied mixed sets did twice as well as the others, outscoring them 77 percent to 38 percent. The researchers have found the same in experiments involving adults and younger children. (Benedict Carey in MIND, Published: September 6, 2010 New Times}

In research quoted in the Journal *Psychology and Aging*, researchers Kornell, Castel, Eich and Bjork found to their surprise that young and older adults could distinguish the painting styles of 12 artists far better after viewing mixed collections than after viewing a dozen works from one artist, all together, then moving on to the next painter. www.williams.edu/Psychology/Faculty/Kornell/Publications/Kornell.Castel.Eich.Bjork.2010.pdf

The myth that intensive immersion is the best way to really master a particular genre, or type of creative work is busted (with apologies to the TV show *Myth Busters*).

In summary mix and match your studies, if you narrow your focus of study too much, you will not develop the mental hooks that the brain needs to solve problems.

Tests are good for learning

Most students dread tests, quizzes and examinations. In fact tests are a great learning tool. Libraries, teachers or professors often have copies of past tests in a subject. See if you can find these tests and practice on them.

Researchers at Washington University had college students study science passages from a reading comprehension test, in short study periods. When students studied the same material twice, in consecutive sessions, they did very well on a test given immediately afterward, but then they began to forget the material.

But if they studied the passage just once and did a practice test in the second session, they did very well on one test two days later, and another given a week later.

Tests are a valuable learning tool. Difficult tests are even more effective learning tools. Researchers call this learning effect “desirable difficulty”.

Explain difficult concepts to yourself or someone else

When I was a student, trying to understand something difficult and probably mathematical, I found that if I went to a friend or colleague or tutor for help, by the time I had framed the question I had often seen the answer myself.

In trying to master something it often helps to explain it to someone else, which is what you are doing when you are framing a question about a difficult topic. It also helps when reading new material to write a précis of that material, to explain it to yourself.

In summary, explain what you are studying to yourself by writing a summary, or explain it to a fellow student.

Don't solve problems on your own, study problems that have been solved

Emeritus Professor John Sweller, a former colleague at the University of New South Wales has shown that instead of asking students to solve problems on their own, teachers helped students more if they presented problems that were already solved.

A three year mathematics course was completed in 2 years by emphasizing worked examples

According to Professor Sweller: "Looking at an already solved problem reduces the working memory load and allows you to learn. It means the next time you come across a problem like that, you have a better chance at solving it".

In another demonstration of the worked example effect Zhu and Simon (1987) found a three year mathematics course was completed in 2 years by emphasizing worked examples rather than conventional instruction.

Studying solved problems is a shortcut to understanding according to John Sweller because it reduces cognitive load. When I was studying in graduate school I used *Schaum's Outlines*. They are part of the educational supplements offerings found in college bookstores. There are also Barron's *Easy Way* series and McGraw-Hill's *Demystified* series. The *Demystified* series is introductory in nature, for middle and high school students.

Schaum's Outlines contain many solved problems, I found them invaluable. I topped most of my classes, had an A average and passed my prelims at first attempt at Wisconsin-Madison.

Exercise

Hot off the press! An article in the New York Times **Well** column by Gretchen Reynolds asks Can Exercise Make Kids Smarter? (September 15, 2010) The answer appears to be *yes*!

In a study at the University of Illinois at Champaign-Urbana children were put on treadmills. Magnetic resonance imaging (M.R.I.) showed that "fit children had significantly larger basal ganglia, a key part of the brain that aids in maintaining attention and 'executive control,' or the ability to

coordinate actions and thoughts crisply. Since both groups of children had similar socioeconomic backgrounds, body mass index and other variables, the researchers concluded that being fit had enlarged that portion of their brains."

In a separate study many of the same researchers showed that fitter children, aged 9-10 who had also completed complex memory tests had 'heftier hippocampi'. Given that the hippocampus and basal ganglia regions of the brain interact to allow intricate thinking then if exercise increases the size of those regions of the brain the researchers concluded that being fit may "enhance neurocognition" in young people".

There is also evidence that even small amounts of aerobic activity can raise test scores. Past research at the University of Illinois found that "just 20 minutes of walking before a test raised children's scores, even if the children were otherwise unfit or overweight".

These studies all relate to young children but a large scale longitudinal Swedish study of more than a million 18-year-old males who joined the Swedish army showed that better fitness was correlated with higher IQs even among identical twins.

There is convincing evidence then that to perform well on tests, keep fit. Even a 20 minute walk before a test will help elevate test scores.

Summary

These techniques — alternating study environments, mixing content, spacing study sessions, summarizing reading materials, self-testing, studying solved problems and fitness will not turn a slacker into a grade-A student; motivation and application still matter.

But the cognitive techniques we have described give parents and students, young and old, a study plan based on evidence, not myth. Follow this plan and you will perform better in school and university.

The Myth of Subliminal Learning

I looked up "subliminal learning software" on Google and got about 53,800 results. I didn't look at all of them by any means but many of the websites were selling subliminal learning software.

One advertiser seeking on-line partners says:

> Experience what many describe as "the most powerful personal growth/mind development tool on Earth." Creates quantum leaps in self-awareness, dramatically lowers stress, sharpens thinking. Dramatically accelerates personal and spiritual growth, guaranteed.

This is certainly an extreme claim for a methodology than has, to say the least, not been substantiated by any scientific research. But, as Google CEO Eric Schmidt said in August 2010 "the internet is fast becoming a 'cesspool' where false information thrives". The many websites selling subliminal learning contribute to the 'cesspool' of false information.

The following information comes from The Skeptic's Dictionary www.skepdic.com/subliminal.html **:** retrieved 07 September 2010

> **subliminal**
>
> The subliminal is below the liminal (the smallest detectable sensation).
>
> Anything truly below the level of detectable sensation could not, by definition, be perceived. However, the subliminal is generally said to be below the threshold of *conscious* perception. There is a widespread belief, not strongly supported by empirical research, that without being aware of its presence or content, a person's behavior can be significantly affected by subliminal messages. Thus, it is believed that one can influence behavior by surreptitiously appealing to the subconscious mind with words and images. If this were true, then advertisers could manipulate consumer behavior by hiding subliminal messages in their ads. The government, or Aunt Hilda for that matter, could control our minds and bodies by secretly communicating to us subliminally. Learners could learn while listening to music embedded with subliminal messages. Unfortunately, "...years of research has resulted in the demonstration of some very limited effects of subliminal stimulation" and no support for its efficaciousness in behavior modification (Hines, Terence, 1990 *Pseudoscience and the Paranormal,* Buffalo, NY: Prometheus Books, 312).

And consider this:

> The fact that there is almost no empirical support for the usefulness of subliminal messaging has not prevented numerous industries from producing and marketing tapes which allegedly communicate directly with the unconscious mind, encouraging the "listener" not to steal, or coaching the "listener" to have courage or believe in his or her power to accomplish great things. Consumers spend more than $50 million each year on subliminal self-help products (*Journal of Advertising Research,* reported by Dennis Love, *Sacramento Bee*, 9-14-2000).

If subliminal messaging did work then it would frighten not only conspiracy theorists. The thought that a government or a commercial organization could subliminally program minds would frighten most people.

And it is not surprising that some people are prepared to spend $50 million a year on dubious technology. Subliminal learning offers learning the very easy way, and consumers spend a lot more than $50 million a year on beauty products that also have no demonstrable effects apart from reducing one's bank balance.

Belief in subliminal messaging appears to have originated in 1957 with James Vicary, an advertising promoter who claimed to increase popcorn sales by some 58% and Coke sales by some 18% in a New Jersey movie theater simply by flashing very briefly the messages "Drink Coca-Cola" and "Hungry - Eat Popcorn" on the movie screen. The messages, he claimed, were on-screen for 1/3000 of a second.

Vance Packard retold the Vicary story in *The Hidden Persuaders*, his mega bestseller about the advertising industry also in 1957, before Vicary admitted in 1962 to lying about his experiment and falsifying the results[17]. The story was, Vicary subsequently admitted, a marketing ploy[18]. It was a very effective marketing ploy; the myth of subliminal messaging resonates to this day.

Vicary's original claim was in any case unbelievable; had anybody bothered to check they would have found that the little cinema in Fort Lee, where his

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[17] Boese, Alex (2002). *The Museum of Hoaxes: A Collection of Pranks, Stunts, Deceptions, and Other Wonderful Stories Contrived for the Public from the Middle Ages to the New Millennium*, E.P. Dutton, ISBN 0-525-94678-0. pp. 137–38.

[18] The Committee for Skeptical Inquiry: The Cargo-Cult Science of Subliminal Persuasion by Anthony R. Pratkanis

experiment was alleged to have taken place, could not possibly have had the 45,699 visitors he claimed through its doors in the space of six weeks. Many people now believe that Vicary did not conduct his experiment at all.

There is a near-consensus among psychologists that subliminal messages do not produce a powerful, enduring effect on behavior[19]. Laboratory research reveals little effect.[20] Research into claims of lasting effects—such as weight loss, smoking cessation, facilitating unconscious wishes in psychotherapy, and how market practitioners may exploit their customers—conclude that there is no effect beyond a placebo[21].

In a 1994 study comparing television commercials with the message being subliminal or supraliminal, individuals produced higher ratings with those that were supraliminal. In other words, individuals were *less* likely to remember the subliminal message than if there were no message[22].

Vance Packard's book *The Hidden Persuaders* led to the myth of subliminal messaging being widely believed and subliminal advertising was banned in the UK and Australia and in the USA by the National Association of Broadcasters. This of course only served to lend credibility to subliminal messaging.

If subliminal messaging were being investigated on the popular TV program *Myth Busters* subliminal messaging would be a myth that has been busted. Nonetheless the myth of subliminal learning remains widespread, and not just among conspiracy theorists.

If you want to learn something more effectively do not rely on subliminal messages. Brainwave entrainment can do the job so much more effectively at lower cost, and it is not subliminal; you can hear those isochronic tones very clearly.

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[19] Pratkanis, A. R.; Greenwald, A. G. (1988). "Recent perspectives on unconscious processing: Still no marketing applications". *Psychology and Marketing* **5**: 337.
[20] Strahan, E. (2002). "Subliminal priming and persuasion: Striking while the iron is hot". *Journal of Experimental Social Psychology* **38**: 556–568.
[21] Moore, T. E. (1988). "The case against subliminal manipulation". *Psychology and Marketing* **5**: 297–316
[22] Smith, K. H.; Rogers, M. (1994). "Effectiveness of subliminal messages in television commercials: Two experiments". *Journal of Applied Psychology* **79**: 866.

Summary

All evidence points to subliminal learning being a hoax first propagated by a marketer who was trying to sell his services. Do not believe in subliminal learning. Do not waste your money buying products that claim to teach through subliminal learning.

If you want to enhance your learning experience or your motivation to learn use brainwave entrainment, it works, unlike subliminal messaging, and has no undesirable side effects.

The Way to Unlimited Success

- **Do not believe the IQ myth.** Nobody is born with a given IQ and you can develop a higher IQ. Your intellectual potential knows no limits.

- **Practice makes perfect.** Too many of us believe in the "talent" myth — that top performers are born, rather than built. But in almost every arena in which tasks are complex, top performers excel not because of innate ability but because of dedicated practice. If you follow productive study habits then there is no limit to what you can achieve. If you really want to succeed in school or university then you must:

    - ✓ Develop the motivation that will help you persevere,
    - ✓ Develop emotional intelligence,
    - ✓ Develop effective study habits, and
    - ✓ Practice, practice, practice.

- **Your brain is an enormously powerful tool.** It is the most powerful computer in the known universe. There are great thinkers in every generation that show just what the human mind can achieve: the Buddha, Aristotle, Confucius, Plato, Shakespeare, Goethe, Voltaire, Newton, Einstein. You may not be another Einstein, there is only so much room at the top, but there is no reason why you cannot be a world class intellect. The only limitations on your mind are the limits you impose upon yourself. Do not let other people tell you that you are limited, you are not.

- **Learning styles -** some theorists believe that each of us favors some particular method of interacting with, and processing information. One of the most widely-used models of learning styles is Fleming's VARK model. The model is quite simple, learners can be categorized as follows:

    1. visual learners,
    2. auditory learners,
    3. reading/writing-preference learners, and
    4. kinesthetic learners.

All the research indicates that there is no evidence to justify incorporating learning styles assessments into general educational practice. Forget about learning styles.

- **Subliminal learning** is a hoax. Do not waste your money buying products that claim to teach through subliminal learning.

- **Parents need to foster a winning attitude in their children.** They have to tell their children that they can succeed. It is the subconscious mind that needs to know this. Principles that derive from mental programming that should be followed in encouraging your child:

✓ **Provide role models for educational achievement.** You, your child and his teachers must not think that working class, African, Hispanic, poor children or girls cannot succeed in school. This is untrue. There are plenty of people from disadvantaged backgrounds that have achieved against in school against the odds. Look for such role models.

✓ **Make goals realistic.** Encourage your child to aim for the top ten percent of his or her class in mathematics, not necessarily for the top position.

✓ **Ignore the problem – focus on the solution.** Do not for instance say 'you must not watch TV while doing homework'. Say 'do your homework in a place free of distractions', and set aside an area where the child can do homework free of the distractions of TV.

✓ **Repetition.** Advertisers know the value of repetition. Repeat your mental programming even after the rules seem to have been learned, this will reinforce desirable behaviors and attitudes.

✓ **Keep it simple.** Do not try to achieve everything at once. And keep your instructions and advice simple, simple words will be processed more rapidly by the subconscious mind.

✓ **Belief and confidence.** Believe in the abilities of your child and yourself and have confidence in them. The human mind is infinitely powerful and it has few limitations. If you have confidence in the

ability of your child to achieve then you will instill that confidence in your child also.

- ✓ **Hire a tutor if you feel you must.** If you can afford a tutor then it may be a good thing to hire one, but it is probably not necessary as long as your child has the learning materials they need.

- ✓ **Meditate.** Learn meditation with your children, it will benefit both you and them. Meditation improves mental focus, health and thinking in general.

- ✓ **Use brainwave entrainment technology.** Brainwave entrainment technology is surprisingly inexpensive and there is plenty of university research to show that it works. It is also simple to use. Your child sits and studies while playing the appropriate mp3 track on headphones or speakers.

If you want to enhance your learning experience or your motivation to learn use brainwave entrainment, it works, unlike subliminal learning, and has no undesirable side effects.

This is the Way to Succeed in School

- **Do not believe the IQ myth.** Nobody is born with a given IQ and you can develop your IQ through study and through brainwave entrainment.

- **Practice makes perfect.** Too many of us believe in the "talent" myth — that top performers are born, rather than made. But in almost every arena in which tasks are complex, top performers excel not because of innate ability but because of dedicated practice. If you really want to succeed in school or university then you must:

    - ✓ Develop the motivation that will help you perservere,
    - ✓ Develop emotional intelligence, and
    - ✓ Practice, practice, practice,

- **You have an enormously powerful tool in your brain.** It is the most powerful computer in the known universe. There are great thinkers in every generation that show just what the human mind can achieve, the Buddha, Jesus Christ, Plato, Shakespeare, Newton, Einstein. There is no reason why you cannot develop a powerful intellect. The only limitations on your mind are the limits you impose.

- **Learning style** theorists believe that each of us favors some particular method of interacting with, and processing information. This led to the proposition that teachers should assess the learning styles of their students and adapt their classroom methods to best fit each student's learning style.

  One of the most widely-used models of learning styles is Fleming's VARK model. According to Fleming's model, which is quite simple, learners can be categorized as follows:

    1. visual learners,
    2. auditory learners,
    3. reading/writing-preference learners, and
    4. kinesthetic learners.

All the research indicates that there is no adequate evidence base to justify incorporating learning styles assessments into general educational practice. Forget about learning styles.

- **Subliminal learning** is a hoax. Do not waste your money buying products that claim to teach through subliminal learning.

For Parents – How To Motivate Your Children

Parents need to foster a winning attitude in their children. They have to tell their children that they can succeed. It is the subconscious mind that needs to know this. There are certain principles that derive from mental programming that should be followed in encouraging your child:

1. **Provide role models for educational achievement.** You, your child and his teachers must not think that working class, African, Hispanic, or poor children cannot succeed in school, they can. There are plenty of people from disadvantaged backgrounds that have achieved in school against the odds. Look for such role models.

2. **Make goals realistic.** Encourage your child to aim for the top ten percent of his or her class in mathematics, not necessarily for the top position.

3. **Ignore the problem – focus on the solution.** Do not for instance say 'you must not watch TV while doing homework'. Say 'do your homework in a place free of distractions', and set aside an area where the child can do homework free of the distractions of TV.

4. **Repetition.** Advertisers know the value of repetition. Repeat your mental programming even after the rules seem to have been learned, this will reinforce desirable behaviors and attitudes.

5. **Keep it simple.** Do not try to achieve everything at once. And keep your instructions and advice simple, simple words will be processed more rapidly by the subconscious mind.

6. **Belief and confidence.** Believe in the abilities of your child and yourself and have confidence in them. The human mind is infinitely powerful and it has few limitations. If you have confidence in the ability of your child to achieve then you will instill that confidence in your child also.

7. **Hire a tutor if you feel you must.** If you can afford a tutor then it may be a good thing to hire one. There are some good inexpensive ones on the Internet.

8. **Meditate.** Learn meditation with your children, it will benefit both you and them. Meditation improves mental focus and thinking in general.

9. **Use brainwave entrainment technology.** Brainwave entrainment technology is surprisingly inexpensive and there is plenty of university research to show that it works. It is also simple to use. Your child sits and studies while playing the appropriate mp3 track on headphones or speakers. Brainwave entrainment technology, including free IQ development to enhance the learning experience is available from www.NeuroLearnings.com It comes with a money back guarantee so you take no risk at all.

Effective Learning Strategies For Students

- **Where to Study.** The conventional wisdom has it that one should stay with one study location, this is not true. Cognitive scientists have found that changing rooms for study improves retention.

- **Focus.** It is widely believed that one should focus intensely on a single topic, research shows, to the contrary, that varying the type of material studied in a single sitting results in far better learning outcomes than does concentrating on just one skill at a time. Mix and match your studies, if you narrow your focus of study too much, you will not develop the mental hooks that the brain needs to solve problems.

- **Tests are good for learning. T**ests are a great learning tool. Libraries, teachers or professors often have copies of past tests in a subject. See if you can find these tests and practice on them. Difficult tests are even more effective learning tools. Researchers call this learning effect "desirable difficulty".

- **Explain difficult concepts to yourself or someone else.** In trying to master something it often helps to explain it to someone else, which is what you are doing when you are framing a question about a difficult topic. It also helps when reading new material to write a précis of that material, to explain it to yourself.

- **Don't solve problems on your own, study problems that have been solved.** Professor John Sweller, has shown that instead of asking students to solve problems on their own, teachers helped students more if they presented problems that were already solved. Use *Schaum's Outlines,* Barron's *Easy Way* series and McGraw-Hill's *Demystified* series. The *Demystified* series is introductory in nature, for middle and high school students. *Schaum's Outlines* contain many solved problems.

- **Can Exercise Make Kids Smarter?** The answer is *yes* – and adults too! Being fit enhances neurocognition. To perform well on tests, keep fit. Even a 20 minute walk before a test will help elevate test scores.

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