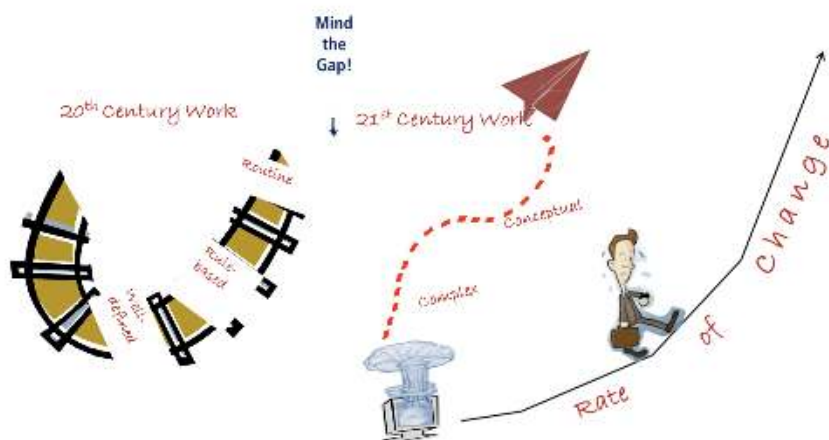
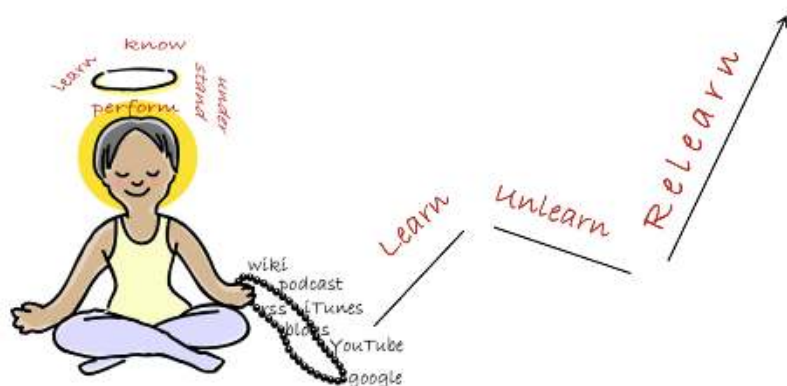




Fire Up the Learner Within

THE ART OF SELF-DIRECTED LEARNING



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Published by:



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My sincere thanks to my nine-year old son, Manan, whose critical comments on the illustrations were invaluable!

Fire up the Learner Within

The Art of Self-Directed Learning

To Learn, To Know, To Understand, To Perform

To Learn

- how to build your inner strength to learn

To Know

- how to become better at acquiring knowledge of a subject matter

To Understand

*- how to develop modes of thinking that help you look at the world
in a different way*

To Perform

- how to attain mastery

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Put the body on the couch!

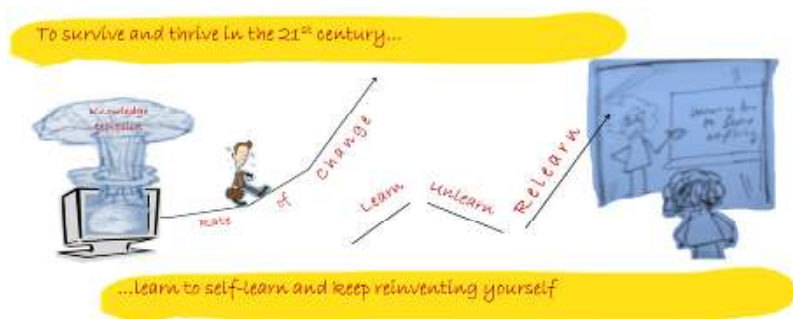
- Do you think you are intelligent?
- Do you consider yourself a 'learner for exams' (driven by extrinsic motivations) or a 'learner for life' (learning for the joy of learning)?
- Did your formal schooling make you a rote learner and now has Google made your memorization skills redundant?
- Does the ongoing knowledge explosion make you wish you could learn more, faster; understand better and stay on top of your game – be it work related or pursuit of a new hobby?



This book will help you improve your ability and capacity to learn.

Whether you are preparing for an exam, or learning a new subject matter for a new job mandate, or learning more about your hobby, or want to pursue learning to deepen your understanding of how the world works, or to acquire mastery, or you simply want to pursue learning for the sheer joy of it, this book will help you improve your self-directed learning skills

Introduction



In this chapter you will learn

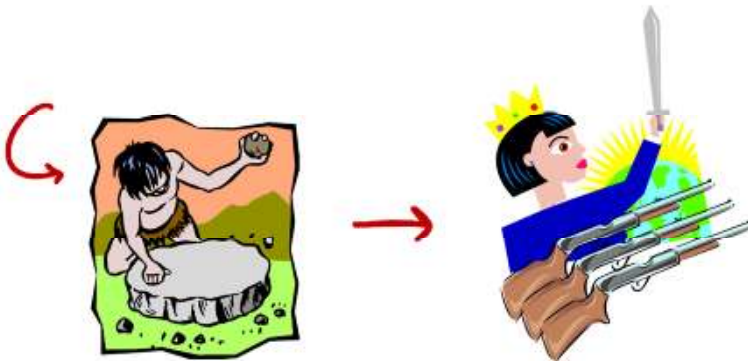
- How 21st century is different from the 20th century because of unprecedented rate of change and explosion in knowledge
- Why lifelong learning, unlearning and relearning is key to surviving and thriving in the 21st century
- Why you need to become an excellent self-directed learner to make optimal use of the vast learning resources available
- Framework of self-directed learning – learning, knowing, understanding and performing (each will be discussed in detail in subsequent chapters):
 - Learning: as a self-directed learner you need to build your inner strength to learn even if learning something new seems daunting at first
 - Knowing: you need cultivate good study habits and pursue your learning goals relentlessly and utilize both formal and informal learning opportunities, including social media
 - Understanding: how deep understanding comes from looking at a topic from multiple perspectives
 - Performing: how to attain personal mastery through deliberate practice and achieve a state of flow by pursuing challenges that are at the edge of your abilities

Guns, Germs and Steel... What Next?

According to Jared Diamond, author of the book 'Guns, Germs and Steel', roots of inequality amongst human societies lie not in superiority of one gene pool over another, instead guns, germs and steel have been the determinants of inequality historically.



Natural geographical advantages made agriculture possible in some areas of earth like in the fertile-crescent of the Middle East (Sumerian civilization). Instead of a nomadic way of life of hunting and gathering for food, humans here settled down.



Regions where grains like wheat and rice could grow had an advantage over regions where only perishable crops could grow because grains required less maintenance and they could be stored for long period of time. Less people were thus required for meeting the nourishment needs of a society.

People who did not have to farm had time to tinker and gradually specialized in other activities like domesticating animals and tool making. Domestication of animals enabled these societies to substitute and hugely augment human muscle power. Constant tinkering with stone tools led to the discovery of metal tools and specialization in metals combined with gunpowder led to lethal rifles and still later to automatic machine guns.

Societies that had an initial natural advantage because of agriculture gradually gained an immense advantage over societies that still remained primarily hunter-gatherers.

Germs are another factor that led to inequality. Agricultural societies that domesticated animals and lived in close proximity with such animals encountered diseases transmitted from animals to humans. Over hundreds of years they developed immunity, but when they came in contact or attacked other societies they introduced their ways of living into these societies that hadn't domesticated animals and could not cope with the germs. Germs and guns decimated these other societies' population.

This happened, for example, when European societies discovered Americas. First guns and later germs decimated the Aztec, Mayan and Inca civilizations.

Today's Context

What will lead to inequality in the 21st century?

One major factor is perhaps 'Digital Divide'. In the sense that today, societies that don't have easy, cheap and instant access to the plethora of information and knowledge that is available will be at a great disadvantage tomorrow.



Another question to consider is that if guns, germs and steel have been the reasons for inequality between societies what could lead to inequality between individuals in the same or similar societies in future?

Outside-In or Inside-Out?

In an interviewⁱⁱ with educationist Elliott Masie, Malcolm Gladwell, author of books like *Tipping Point*, *Blink* and *Outliers*, explained that his larger premise in his writings is that ‘people are not built from the inside-out but from outside-in’, which is to say that individuals are the product of the environment and culture they live in and success depends on opportunity that is given to them by the world that they live in.

Can You Influence Your Life – Inside-Out?

Taking cue from the earlier observation that digital divide is probably one of the determining factors that could lead to inequality amongst societies in the 21st century can we say that individuals, if they can cross the digital chasm and avail all the information and knowledge available today, can significantly improve their chances of growth?



Or even if an individual is in a 'digital-haves' society but personally lacks the skills to make use of digital technologies to enhance own knowledge and understanding, chances are that such an individual will not thrive.

In the 21st century, not being able to adapt to fast pace of change and not being able to reinvent yourself as knowledge in your area of expertise explodes are two important factors that will impede your chances of success.

For people in the 'digital have-nots' society what is needed is that this chasm be bridged.

At an individual level, even if you are in a digital-haves society, what is needed is acquisition of skills to ensure that you can quickly access, learn, understand and apply knowledge.

To survive and thrive in the 21st century you need to understand the 'Art of Self-Directed Learning'.

Why does 21st Century Require a Self-Directed, Lifelong Learner?

The Saber-Tooth Curriculum

In his book 'Saber-Tooth Curriculumⁱⁱⁱ' author J. Abner Peddiwell, with tongue firmly in cheek, tells this story.

The first educationist, in the primitive age, was 'New-Fist', inventor of the first fist hammer and many other innovations. That time men caught fish with bare hands, clubbed the lazy woolly horses for meat and drove away saber-tooth tigers with fire.



New Fist, who was a thinker, perfected these arts and thought of ways to teach these skills to children. Thus started the first school with Saber-Tooth Curriculum.

Conservative members of the tribe resisted these newfangled ideas about formal education. They said 'Great Mystery' who speaks in thunder and lightening never wanted children to be formally taught. However, since these skills were very useful and brought in more food, New Fist's school prevailed.



Time passed and conditions changed. A great glacier crept closer to the tribe's valley. The once crystal clear streams became muddy and it became impossible to catch fish with bare hands. The ground became marshy and the lazy woolly horses went east to dry plains. Instead came nimble antelopes. The saber-tooth tigers became extinct and were replaced by ferocious glacial bears. Putting meat on the table became extremely difficult.

A free thinker of New Fist breed figured that vines could be knit together to form nets to catch fish even in murky waters. Another discovered that the vines could be used to form a noose to catch the elusive antelopes. Yet another found that digging a deep pit in a bear trail and covering it with leaves and branches was an efficient way to trap the bears.



These men proposed that the Saber Tooth curriculum be replaced with a new curriculum – “Fishnet making, Antelope-snare construction and Bear catching techniques” curriculum.

The sober majority was horrified. “What have these practical activities got to do with education!” they said.

Have the conditions changed in the 21st century?

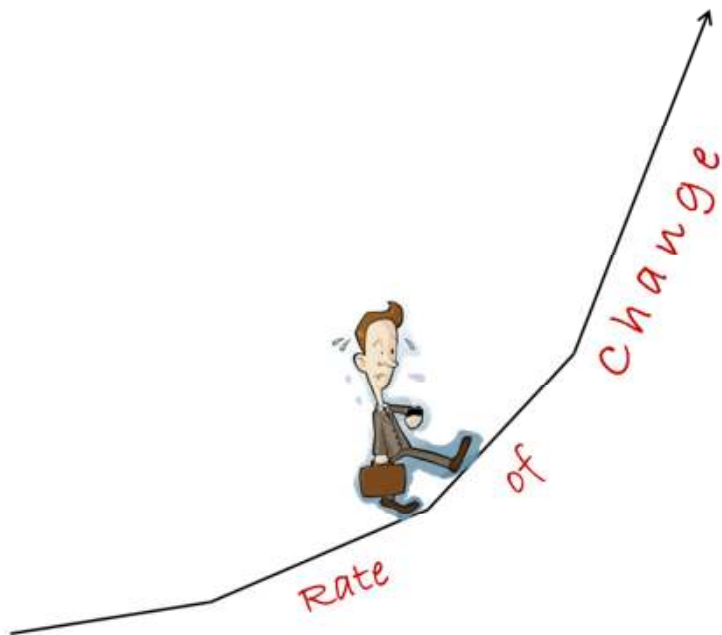
Is the context different?

Do we need new skills to survive and thrive?

Welcome to the 21st Century



21st century world is indeed different. The world is no longer complicated it is now complex. A jigsaw puzzle is complicated. It is difficult to solve but has a unique solution. Chess is complex – it is difficult and there is no unique solution. Global warming to career choices the issues today have become complex.



Rate of change is faster than ever before and information is exploding. According to the American Society of Training and Documentation (ASTD), the amount of knowledge in the world has doubled in the past 10 years and is doubling every 18 months.

More importantly, because information and knowledge is growing at an unprecedented rate, we do not know what the future will hold and hence what future should we prepare for?

Memorization is neither possible nor required because technology allows easy storage and access. Deriving meaning and insights from information has become far more important than memorizing facts and information.

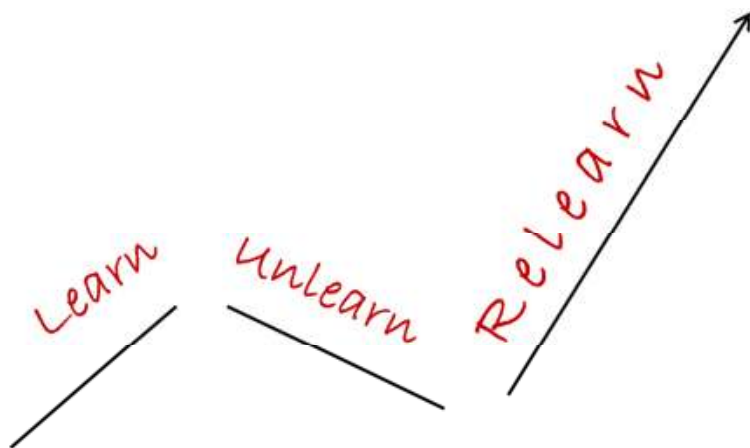
Richard Riley, Secretary of Education under President Clinton very rightly observed, "We are currently preparing students for jobs that don't yet exist... using technologies that haven't yet been invented... in order to solve problems we don't even know are problems yet."

To thrive in such an uncertain scenario, we need to focus on acquiring and honing skills and values that are fundamental.

Jared Diamond, author of 'Guns, Germs and Steel', notes that, "The crux of success or failure is to know which core values to hold on to, and which to discard and replace when times change."

Famous author Alvin Toffler observes, "The illiterate of the 21st century are not those that cannot read or write, but those that cannot learn, unlearn and relearn."

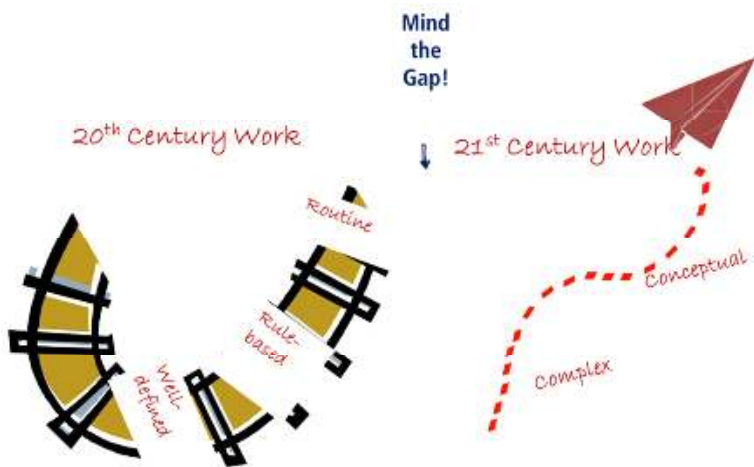
In the article 'Minds on Fire'^{iv} John Seely Brown and Richard Adler explain that 20th century education was focused on providing basic cognitive skills and a stockpile of knowledge. You chose an area where job possibilities were bright, gathered knowledge in that area and were set for life.



Today, you don't change several jobs you change several careers!

21st century education needs to be different because rate of change is so rapid that just keeping up-to-date in any domain is a challenge. You need to make sure that your skills don't become obsolete and that you are able to make the most of the plethora of new opportunities that are opening up because of rapid pace of change.

Imagine a profession like doctor, engineer or accountant. New information and knowledge is getting added to the domain faster than ever before – be it knowledge about the genome and its impact on the doctor's profession, discovery of new materials that impact engineering or new laws like Sarbans Oxley or Basel-3 that accountants and bankers need to be aware of.



In his book 'A Whole New Mind' author Daniel Pink explains that in the 20th century work was mostly well defined, routine and rule based. However, in the 21st century such work first gets outsourced to locations where labour is cheaper and after a few iterations of price arbitration, it simply becomes automated i.e. machines instead of humans perform that work.

You can think of call-centre support and telemarketing. Such work first got outsourced to cheaper and cheaper destinations and increasingly we are seeing lot of it becoming automated. For example, pre-recorded messages you receive on your phone that says that you have won a lottery!

According to Pink work in 21st century is becoming complex and conceptual and rules are not clear.

In his other book 'Drive'^{vi} Pink suggests a new operating system for the 21st century that is based on 'autonomy', 'mastery' and 'purpose'. Autonomy is the urge we have to direct our lives, mastery is desire to get better and better at something that matters and purpose is a yearning to do something that is larger than our self interest.



In the context of the 21st century self-directed learning skills become imperative. Whether to keep pace with the new developments in your area of work, or learning for the sheer joy of finding out something new and thus deriving pleasure and satisfaction.



Abundance and ease of access of information and knowledge works in favour of the self-directed learner. Wikis, blogs, lectures from experts, podcasts and e-books make learning content available on tap. In addition to the web, mobile phones further facilitate any time, any pace, any place learning.

What you need for success in the 21st century is to learn the Art of Self-Directed Learning, i.e. learn how to learn, know, understand and perform and become an excellent lifelong learner.

Learning Attitude

The right attitude towards learning is most critical for becoming a passionate lifelong learner. A lifelong learner is a person who is good at both learning efficiently for a particular purpose and learning for the sheer joy of learning.

The purpose of learning could be desire to do well in an exam, or learning about a new topic because a change in job mandate so requires. This is learning for an extrinsic reward. Learning for the sheer joy of learning is when you learn something not because you will be rewarded but when learning something new itself makes you feel satiated and happy.

Becoming a good lifelong learner requires a change in attitude. But how does one bring about an attitudinal or behavioural change?

Make that Change!

In the book 'Switch^{viii}' authors, Chip and Dan Heath, explain that for bringing about behavioural change you need to do three things:



- First, 'Guide the Rider' where 'Rider' is your 'Rationality' and it needs very clear input on what direction to take (e.g. to become slim stop drinking whole milk).
- But the puny Rider (rationality + will power) is nothing in front of the mighty 'Elephant', your 'Emotions'. So you need to motivate the elephant (e.g. seeing a picture of what fat does to your arteries and how that may lead to a heart attack could motivate you to become serious about your diet).
- Third factor is 'Show the Path', that is what steps you can take to change your behaviour or attitude (e.g. you eat the last bit of the popcorns no matter what the size of the pack, so better buy a small pack).

This book provides guidance and path to your 'rider' on how to become a better learner. What you need to do is to 'motivate your elephant'!

The book is divided into four parts – to learn, to know, to understand and to perform.



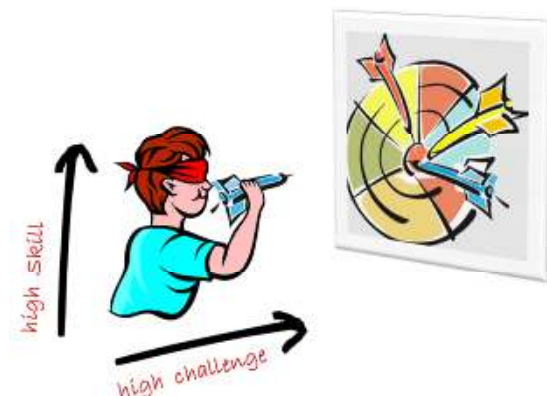
In '**learning to learn**' we will look at how you can build your learning strength by cultivating dispositions like emotional resilience, grit and deep engagement.



In '**knowing**' we will look at how you can become better at acquiring knowledge in a particular subject-matter both in a formal context like school or university and informally, especially using online learning networks.



In '**understanding**' we will discuss ways to acquire deep disciplinary knowledge and modes of thinking that help us look at the world through different lenses which leads to deeper understanding.



Finally in '**perform**' we will focus on assessment, personal mastery and achieving a state of flow and also look briefly at success and failure.

As Captain Barbossa explains in the movie 'Pirates of the Caribbean', "The (Pirate's) code is more what you'd call 'guidelines' than actual rules", likewise segregation of art of self-directed learning into learning, knowing, understanding and performing has been done to create a framework for ease of comprehension. It is a guideline it is not an algorithm.



In fact, we are yet to discover a learning algorithm, a universal learning formula that works in the same way for all of us. So peruse through the book to understand different perspectives on learning and pick nuggets that help you become an excellent self-directed learner.

Let's dive into the first part – 'Learning to Learn'.

To Learn



In this chapter you will learn

- How to fire up your yearning to learn and build your inner strength to learn even in the face of challenges
- Why you need to have a beginners' mind – always curious and eager to learn
- How intelligence is not a fixed or inherited trait and hard work makes it grow
- How the brain is plastic and can create new neural learning networks all life long
- Dispositions of a good learner and how you can acquire these traits like,
 - Emotional resilience to deal with the possibility of failure or humiliation intrinsic in learning something difficult
 - How to deeply engage with the learning content and how to quickly get back to learning when distracted
 - Understand the difference between mindless rote learning and mindful learning
 - How both the learning journey and the outcome should excite a learner
 - Need to be aware of own way of learning and strive for constant improvement – meta-learning

Imp

Beginner's Mind



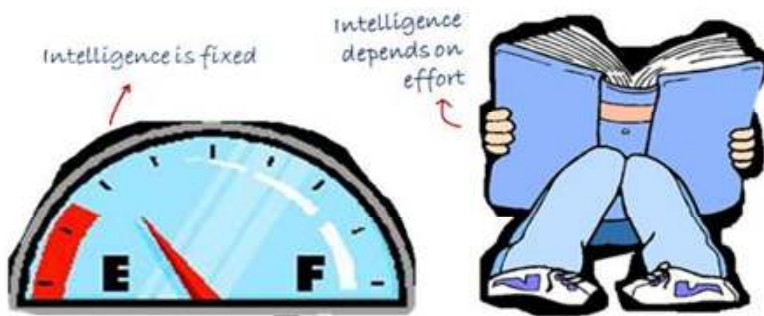
In Zen Buddhism, there is a concept called 'Shoshin' or Beginner's Mind. It refers to having an attitude of openness, eagerness, and lack of preconceptions when studying something, even when studying at an advanced level, just as a beginner in that subject would.

Infants and pre-schoolers are ideal example of 'beginners' mind'. They are natural learners who learn without any formal guidance, by absorbing everything and constructing meaning.

Beginners mind implies having an innate curiosity, being able to suspend judgment (and hence your cognitive biases) and then approaching any topic you want to learn about. Such an approach allows you to look at the topic from multiple perspectives, which leads to deeper understanding.

Do you have a Beginners' Mind?

Carol Dweck^{viii}, a social psychologist at Stanford University, has done extensive research on mindsets about intelligence and ability. Her work shows that people have one of two mindsets about intelligence and ability. Either they believe they have 'fixed' intelligence i.e. their abilities are innate, or they believe intelligence and abilities can grow through hard work.

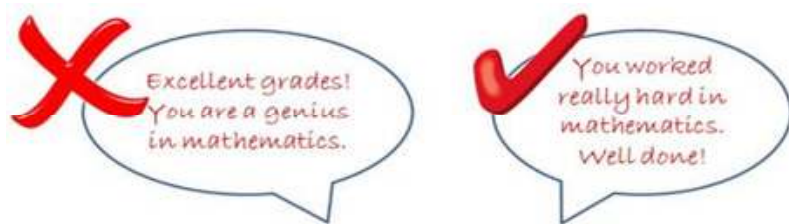


Whether a person has a 'fixed' intelligence or 'growth' viewpoint can be gauged from their response to failure. People with 'fixed' mindset dread failure because it shows their ability in negative light, while people with growth mindset take failure in their stride because they believe performance can be improved through hard work. The latter challenge themselves and set stretch goals and hence increase their abilities, even if they fail at first.

People with a fixed mindset acquire what psychologists called 'learned helplessness'. In a study students with both fixed and growth mindset were given a set of very easy math problems. Both groups solved the problems without any difficulty. Then both groups were given a set of very difficult math problems, which neither group could solve.



Subsequently, both sets were again given a set of easy problems. While the group with 'growth' mindset was able to solve these problems, the other group with 'fixed' mindset failed to do so because they became dispirited while tackling the very difficult problems and their self-confidence was shattered. People with fixed mindset are wary of taking tough tests because of the fear of failing.



Do you think your intelligence is fixed or do you think it is malleable and can be developed even more over time?

Dweck's work further suggests that if, when you were young, you were praised for 'outcome' (like your grades) and not for your 'effort' then you might believe that you have a fixed intelligence and ability. I.e. you are innately good at something and not good at other things and that is that.

According to Dweck, "People who believe in the power of talent tend not to fulfill their potential because they're so concerned with looking smart and not making mistakes. But people who believe that talent can be developed are the ones who really push, stretch, confront their own mistakes and learn from them."

Good news from Dweck is that even if you have a 'fixed' mindset about your intelligence and ability, change is possible!

(As an aside, 'Brainology' is a programme based on Prof Dweck's work that helps nurture a growth mindset in young children. More info is here: <http://www.brainology.us/>)

The Plastic Brain

During the 20th century, neuroscientists believed that lower brain and neocortical areas in the brain were immutable in structure after childhood. That is, the brain, other than areas related to memory, does not change after the critical period of infancy and new learning only happens by changing of connection strength between nerve cells, called neurons, but new neurons are not produced.

This belief is being challenged by new findings, suggesting new neurons and new connections between neurons are formed and removed in all areas of the brain throughout life. In other words, the brain is malleable and 'plastic' even after childhood.



Brain Playdough

Brainplasticity or neuroplasticity or cortical re-mapping refers to the ability of the human brain to change as a result of one's experience. Studies show that environmental changes can alter behavior and cognition by modifying connections between existing neurons.

According to the theory of neuroplasticity, brain far from being immutable, can actually change both physically (anatomy) and functionally (physiology) from top to bottom, throughout life.

The bad news here is that our brains are vulnerable to outside influences and hence we can acquire a stubborn habit, or a bad behaviour because once a plastic change occurs it becomes well established.

The good news of course is that because the brain is plastic, once you make a resolve to change a bad habit, a negative attitude, or a destructive emotion, you can do so.

“The power of positive thinking finally gains scientific credibility” is how New York Times summarizes a seminal work on neurogenesis, ‘The Brain that Changes Itself^{ix}’ – a book by Norman Doidge.

Firm in the belief that change is possible, that you can become a better, nay excellent learner, let’s look at the traits or dispositions of a good learner and see how these traits and dispositions can be acquired and honed.

Dispositions of a Good Learner

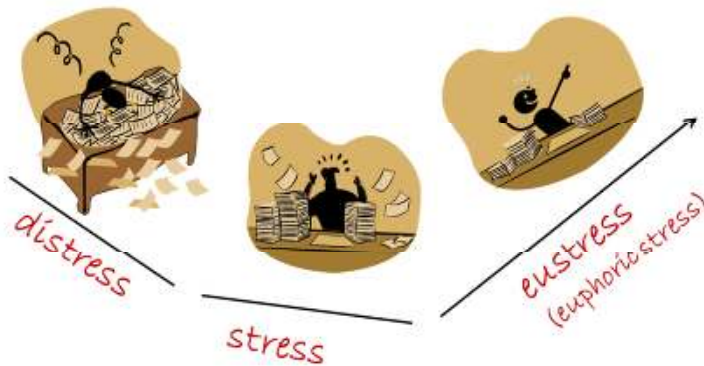


You are a good learner when you have traits like tenacity, curiosity, imagination, self-awareness, self-discipline and resourcefulness. These traits are also described as habits of the mind or dispositions.

Let’s look at these dispositions in more detail and see some of the ways by which you can nurture them.

a) Emotional Resilience

Learning is an emotional business. You can be interested or absorbed in learning, or you can be bored, or you can be anxious and distressed. The ability to tolerate or cope with these emotions is called resilience. Being a good lifelong learner means knowing how to face confusion and frustration without getting unduly upset.



If you withdraw at the first sign of difficulty or frustration your learning will be shallow. You need to look at learning like going on an adventure, which will involve hard work, difficulties, moments of frustration but also fascination, absorption and exhilaration.



Possibility of failure and fear of humiliation are probably the two biggest factors that we shy away from learning something new. Wrong beliefs about learning also make learning difficult. For example, the belief that learning should be easy and if you have to put in more effort than others it implies you are stupid. Or, learning should be fun and hence if you face a difficult situation while learning and it takes away the fun you give up.

Your attitude to learning really matters. Instead of thinking that learning should be easy and fun, you should respect difficulty and find a higher order of fun in pursuing a difficult task.



Successful learning begins not with talent but with approach to the task. A belief that it is effort that is crucial. The struggle to learn something is where the learning lies. Attitude and not ability defines your learning ability.

Malcolm Gladwell, author of *Blink*, *Tipping Point*, *Outliers* and *What the Dog Saw*, talks about 'compensation strategy'. A study done of football players found that those drafted in the bottom percentile performed better than those who were drafted first with high expectations. Since players in the lower percentile did not think they had the talent that the first draft picks had, they worked twice as hard. Result was they performed better!

According to Josh Waitzkin, eight times US national chess champion, several times world champion in martial arts and author of the book 'Art of Learning^x', "With hard work difficult materials can be grasped. Step-by-step, incrementally, the novice can become the master." Waitzkin also believes that a state of being fundamental to the learning process is when we are unhindered by internal conflict.

We need to maintain or quickly reestablish concentration when we get stuck with something difficult or get frustrated. This is called persistence and it is a must-have attitude for learning.



Neuroplasticity, which says our brains are not hard wired, instead neurons in our brain keep getting added throughout our life and experience can rewire our brain, gives us insight into how we can change our attitude to learning and become resilient learners.

Shelley Taylor and her colleagues at UCLA, instructed a group of first year Psychology undergraduates, to visualize themselves, a week before exams, studying in a way that would lead to the achievement of an A grade. These students were given prompts such as seeing themselves sitting at their desks or in the library, getting up and turning off the TV, declining a friend's invitation to go out for a drink and actively reviewing lecture notes.

Compared to a control group who did not go through this process, the visualizers started their revision earlier, spent a third longer actually studying, and improved their examination score from 65% to 73%.

The beneficial effect of mental visualization was only found when the students focused on the actual studying. Another group who were asked to visualize themselves having obtained 'A' grade, feeling happy, confident and proud, showed no gains compared with the control group.



In fact, in another study Shelley Taylor found that concentrating on images of success, rather than of studying, had negative effects. This finding is very different from what most self-help books have to say about simply vividly visualizing success to make it happen.

According to Guy Claxton, in his book *Wise Up*^{xi}, “Simply daydreaming about fame and glory, without visualizing the steps needed to get there, is worse than useless... It is imaginatively constructing the journey and not the arriving that counts.”

Imagining the process helps us map out the details to arrive at better time estimates for our learning journey. Imagery is also useful in overcoming emotional difficulties. Mental visualization can significantly improve resilience.

Daniel Goleman, author of the famous book, ‘Emotional Intelligence’^{xii}, notes in his book that at best IQ contributes about 20 per cent to the factors that determine life success, which leaves 80 per cent to ‘other forces’.

Goleman has been researching this topic and has co-founded an organization, ‘Collaborative for Academic, Social and Emotional Learning’ (CASEL - <http://www.casel.org>). Pertinent to the discussion here, CASEL has identified following life skills that life long learners should have:



Uroboros
- self-reflexivity

Self-awareness – accurately assessing one’s feelings, interests, values, and strengths; maintaining a well-grounded sense of self-confidence

Self-management – regulating one’s emotions to handle stress, control impulses, and persevere in overcoming obstacles; setting and monitoring progress toward personal and academic goals; expressing emotions appropriately

Other social and emotional learning skills (SEL) include, social awareness, relationship skills and responsible decision-making.

Goleman's work is especially important because in the last few decades the 'self-esteem' movement has grown hugely, with a simplistic message that all you need is self-belief and no hard work is required, no setbacks need be endured for success. Self-control or the ability to persevere or keep going is a much better predictor of life outcomes than self-esteem.

According to economist and Nobel laureate James Heckman
"Numerous instances can be cited of people with high IQs who fail to achieve success in life because they lacked self-discipline – and of people with low IQs who succeeded by virtue of persistence, reliability and self-discipline... Persistence pays as do other non-cognitive skills."



Resilience, which originates from the Latin word *resilio*, 'to jump back', is what emotionally intelligent learning is all about. A good learner is willing to give learning a go even if the learning path is arduous and outcome is uncertain.

b) Deep Engagement

Ability to stay deeply engaged in learning is a critical disposition. Usually if the reward of learning is very tangible, like learning to pass an exam or learning for a new job mandate, then learner motivation is there and that helps the learner stay absorbed in learning.



But when the reward is not very clear, or there is no immediate context for learning, say while reading a good newspaper editorial on poverty, or on string theory, can you still stay engaged? Or have you self-limited your propensity to learn because you don't see immediate utility of learning something new?

Any learning can be made pleasurable if we approach it with a different attitude. In her book 'The Power of Mindful Learning^{xiii}', Ellen Langer explains, "If we have long held a mindset that a particular activity is arduous, changing to a mindful attitude may be difficult, but the difficulty stems from the mindset and not the activity."

What is a 'mindful attitude'? It is the opposite of mindless attitude or what Langer describes as 'autopilot' mode of learning. An increased involvement in learning is what she calls mindful attitude to learning.

In a study Langer asked participants who did not particularly like classical music to listen to classical music; those who thought watching (American) football was boring were asked to watch the Super Bowl. One set of participants were asked to notice three to six novel aspects about the activity. For music, for example, the participants could try to notice musical instruments they could identify. In each case a control group did the same activity but without any instructions to notice differences. The Study revealed that the more the distinctions drawn by careful noticing, the more the subject liked the activity.

What this Study shows is that the more we deliberately engage with a task the more interested we become and more we learn. For example, instead of simply reading a book, we could develop the habit of looking at the narrative from the perspective of the protagonist, then look at it from the perspective of the adversary, then look at it from another character's perspective. Looking at the same book from multiple perspectives will make the reading more enjoyable and will lead to deeper understanding.

The opposite of mindful engagement is mindless rote. "When some material has no personal meaning for us, but we need to learn it, then we tend to memorize it" says Langer

To build meaning into a piece of information, instead of viewing it as a 'must', view it as a 'could'. That is to say even if information is presented in a uni-dimensional perspective, you must intentionally build additional viewpoints. Viewing a piece of information from multiple perspectives helps build meaning and making the information relevant to you can remove the necessity for memorization.

According to Langer, this is because Information that is about ourselves or related to us is easiest to learn. Psychologists call this the 'self-reference effect'. Thus, by asking questions, looking at information from multiple perspectives and relating the information to your personal life, you can make the information more meaningful and hence understand it better and remember it longer.

You can relate information to your life by looking at how parts of the information relate to your past, present or future, how it could be important to yourself or someone else you know, or finding some other significance in the information.



Relating self-reference effect with the earlier point of looking at information from multiple perspectives to look for distinctions helps us appreciate that the information is situated in a context and implies that other contexts may be considered. Thus, more perspectives or distinctions we notice, more likely that it will result in information becoming of greater personal interest to us and hence lead to better understanding and longer recall.

c) Dealing with Distractions

Once you have figured out how to engage yourself in learning, by looking at material from different perspectives and by making the information of personal relevance to you, you then have to learn to deal with distractions. Good learners know how to quickly come back to learning when they get distracted.

Distractions can be internal or external. You could find it hard to concentrate when you are hungry, tired, anxious, angry or frustrated.



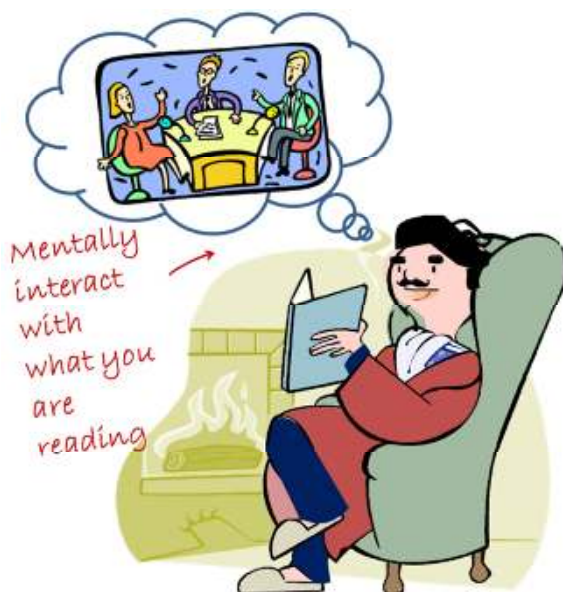
To better understand how you can deal with distractions let's first look at the opposite of distraction, which could be called 'staying focused' or 'paying attention'.

What do we mean by 'paying attention'? In normal parlance it means focusing on the matter at hand and if our focus wanders we say we are distracted. Langer has an interesting perspective on 'creative distraction'. She says that when we are distracted we are paying attention to something else. So perhaps we should try and understand what is so attractive about the alternate stimulus and what can we learn from this other attraction?

Langer explains that the natural state of the mind is to seek variety. Thus, for us to pay attention to something for any amount of time, the image must be varied. For example, we usually have no difficulty in paying attention to play because in play novelty is inherent – every minute of a tennis match is different.

The trick to improving attention lies in our ability to vary the target of our attention. We need to figure out ways of looking for novelty in a stimulus that otherwise seems static, say a teacher talking in the class or when we are reading a long research paper. By creating novelty in a stimulus we will make it more interesting and hence not get distracted.

For example, reading a story from the perspective of different characters in the story, or you could make up different endings to the story and so vary the perspective of what you are reading, even when the material being read is static. Go beyond what is given in the story, this mental interaction with the story will make the stimulus (the story) more novel and hence more interesting. The earlier point of finding personal meaning through different perspectives is also pertinent here.



Attentive noticing and having a dialogue with the author, in your head, also helps you see underlying patterns and connections in the information. Seeing patterns and making connections can further help in linking the information to yourself and thus make it easier to understand and recall the information.

d) Making Meaning

The process of looking at new information or experiences and connecting them with what you already know is called 'making meaning'.

Understanding the big picture and creating own frameworks or analogies of the big picture so that as you read you can relate to the analogy or framework of the big picture, helps in better understanding. Think of it like creating a map of the topic so that at any point in your reading you know 'you are here'.

For example, in this presentation/book, the big picture is – To Learn, To Know, To Understand, To Perform and right now you are in ‘To Learn’ section, reading about traits of a good learner.



Mindmaps are helpful in creating a big picture framework but it may be a good idea to think of ‘before’ and ‘after’ mindmaps i.e. a broad mindmap that you should create, even if it is a mental mindmap, before you start reading a book or other material. This can be done by reading the blurb, the table of contents and skimming through the book (not recommended for a whodunit!).

The ‘after’ mindmap is the usual mindmap that sums up the book. It may be more effective to create your own mindmap rather than relying on a mindmap created by someone else.

e) Imagination

Imagining is another way that helps in looking at something from multiple perspectives.

Guy Claxton, in his book 'Building Learning Power^{xiv}', describes two types of imagining. In Active Imagining you create a scenario in your mind's eye. This is also called 'mental rehearsal' and sports people often use this technique. The second kind of imagining is 'Receptive Imagining' which is like daydreaming, when you let the problem or learning material slip into your sub-consciousness.



The receptive imagining is similar to what Michael Polanyi calls 'indwelling' and Prof John Seely Brown very aptly describes as 'marinating in the problem space'!

f) Grit

In a paper titled 'Grit^{xv}' (produced by Young Foundation) author Yvonne Roberts describes grit as stamina to learn.

The author quotes academics Duckworth, Peterson, Matthews and Kelly who describe grit as, “working strenuously towards challenges, maintaining effort and interest over years despite failure, adversity and plateau.” The gritty individual, these academics explain, “approaches achievement as a marathon: his or her advantage is stamina. Whereas disappointment or boredom signal to others that it is time to change trajectory and cut losses, the gritty individual stays the course.”



The academics discovered it was not simply that some individuals, younger or older, work harder, it was also that they did so in a particular way. Grit involves long-term goals, commitment and determination. In other words, it entails even more than self-discipline and self-control.

The academics devised a ‘grit scale’ containing questions and statements such as “I finish whatever I begin” and “My interests change from year to year”. They asked the public to respond via a website. Duckworth et al established that IQ matters, but it becomes even more potent when stamina is injected.

These two lines from the poem ‘Invictus’ are worth remembering here.

*I am the master of my fate:
I am the captain of my soul.*

g) Delayed Gratification

In a longitudinal study done in the 1960s, Stanford University psychology researcher Michael Mischel demonstrated how important self-discipline (the ability to delay immediate gratification in exchange for long term goal achievement) is to lifelong success.

A group of four-year-olds were given one marshmallow and promised a second one on the condition that they wait twenty minutes before eating the first one. Some children were able to wait and others could not. The researchers then followed the progress of each child into adolescence and demonstrated that those with the ability to wait were better adjusted and more dependable (determined via surveys of their parents and teachers), and scored significantly higher on the Scholastic Aptitude Test years later.



Delayed gratification is the ability to wait in order to obtain something that one wants. This attribute is known by many names, including impulse control, will power and self control.

We have been often told in life to work hard now so that rewards can be reaped later. We often tell our children the same thing – do your homework now and then you can watch television.

While, as shown by the Marshmallow experiment and as further reiterated by Daniel Goleman, delayed gratification and impulse control are indeed positive traits, Langer has a different and very interesting take on delayed gratification and learning.

According to her, implicit in the concept of delayed gratification is the idea that work (or learning) activities are necessarily arduous. However, work that we do in order to gain future rewards often turns out to be absorbing and a pleasure, where the rewards, when they arrive, may seem unimportant.

Delayed rewards may feel empty. The promise of a big payoff in future diminishes our appreciation of the present moment.

We should instead turn work into play and in the context of learning enjoy the process of going from not knowing to knowing, a pleasure and an enjoyable activity. According to Langer, “Most tasks are not inherently pleasant or unpleasant, but an evaluation imposed on a task carries such a presumption... (if we don’t enjoy the process) then even play can feel like work.”

A Shloka (verse) in the Indian scripture Bhagwad Geeta, “Karmanye Vadhikaraste Ma Phaleshu Kadachana...” urges us to put in the best of our effort without worrying about the reward.



‘Life is a journey and not a destination’ is another way of looking at our effort to learn something new. The journey, or the process of learning, is what makes life interesting and fun.

h) Meta Learning – Learning about Learning

Just as metacognition is thinking about your thinking, meta-learning is being aware, through reflection, about the process of learning as you learn something. In other words, while you are learning something you reflect on your learning process and draw out general principles and explicit understanding of how you learn best. You then apply this knowledge when you next learn something new and thus keep improving your learning process.

Meta-learning or reflecting on how you learn best is imperative because there is no one single approach to effective and efficient learning. As a learner you need to monitor and review your learning.

In recent years there has been a lot of talk about learning styles – auditory, visual, kinesthetic, deductive, inductive et al. But perhaps more important than knowing your preferred or dominant style of learning is to strive to become a multifaceted learner, who has a few dominant learning styles but can also learn using other styles.

The analogy here could be taken from leadership studies which show that an effective leader is a person who has one dominant style of leadership, say ‘taskmaster’, but also hones other styles like ‘coaching’. Such a leader can then adopt a style that is better suited to the context, for example taskmaster approach if the company is under threat and coach when the company is in a growth phase.

Having multiple learning styles is especially useful in today's context where internet has made colossal learning resources available – video lecture by experts, podcasts, games and simulations, wikis, blogs, ebooks and more. The more comfortable you become in using different modes of learning the more resources you have available to you.



*If you cultivate multiple learning styles,
more learning resources become available*

Chris Watkins, a reader in education at the University of London Institute of Education, in a paper titled 'Learning about Learning' says, "To help learners become more effective requires, helping them gain an understanding of their own learning, helping them develop skills of monitoring and reviewing their learning, paying attention to the learner's goals and the learner's understanding of their own processes and maintaining the message that a diversity of practices can be effective for learning."

Watkins suggests four practices for learning about learning:

a. Noticing things about learning

What is learning? What is it not? What helps your learning? What steps or actions do you take in your learning? How does it feel? What hinders your learning? What do you learn for? What do you do with your learning?

b. Conversations about learning

Think of a really good learning experience. What made it so good? What did you contribute? What does this tell you about you? About learning?

c. Reflecting on learning

Keep a learning journal and review it to see - What was your learning process like six months ago? What connections or patterns do you see? What new understandings about your learning have emerged?

d. Planning and experimenting with learning

Make learning an object of learning. Think of it as an additional cycle in learning as shown in the diagram below



Meta-learning is thus learning about learning, intentionally. Reflecting, monitoring, reviewing how we learn helps us in becoming better learners.

Do you Yearn to Learn?

We have come to the end of the first part of Art of Self Directed learning, where we focused on learning to learn or how to build your inner strength to learn.

We discussed how a beginner's mind is innately curious and how we can change our beliefs about ability and intelligence and develop a growth mindset – that ability and intelligence is a factor of effort and hard work and not something innate, something fixed.

We also discussed dispositions of a good learner and how you can nurture these dispositions. How you can become more emotionally resilient to deal with the ups and downs of learning, how you can deeply engage with learning, how you need discipline, determination and grit to become a good learner and finally how you need to reflect on how you learn to become a better learner.



In essence, if you can charge up your elephant (your emotions) that good learning skills are imperative in the 21st century where rate of change and pace of acquisition of new knowledge is unprecedented, and fire up your yearning to learn, then you have taken that first crucial step in becoming an excellent self-directed learner.

To Know



In this chapter you will learn

Imp

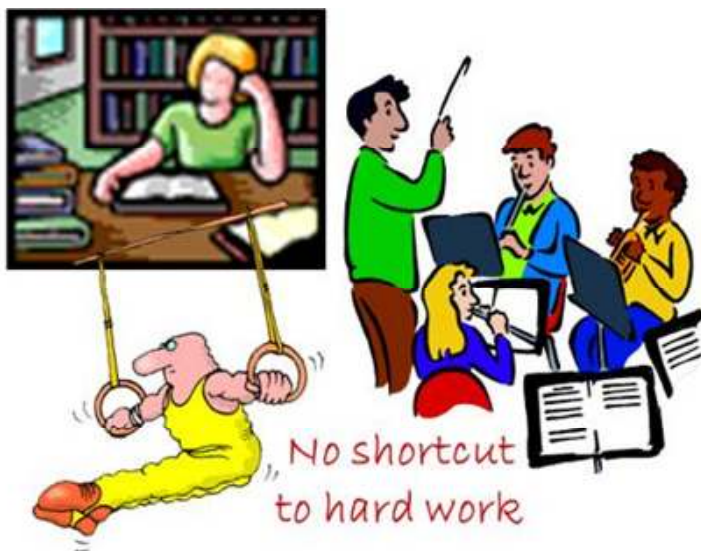
- What are good study habits and how to cultivate them
- In a formal learning environment how to prepare before, during and after a class using techniques like active reading, annotating and note making
- How to plan, schedule, prioritize and overcome procrastination
- How to create a virtuous cycle of setting goals, cultivate good study habits, study hard, celebrate wins, gain self-confidence and pursue higher goals
- What is informal learning and how you can learn informally online using social media like Facebook
- How serious gaming and mobile learning can help you
- Downside of online learning

Whether you want to crack an exam, or gain knowledge about a new area like learning for a new job mandate, or learning more about wine or cheese, good study habits make you an efficient learner.

In this section we will cover two aspects of 'Learning to Know'. The first aspect is 'Study Skills' that are especially useful in formal learning situations and the second aspect is 'Informal Learning', where online learning plays a critical role.

Self-study Skills for Formal Education

These skills are most relevant for students in school or University, or for parents who would like to explain these skills to their school going kids. For people who are no longer in formal education next section on informal learning skills may be more relevant. Although skills like active reading, annotating and setting learning goals are also relevant for informal learning.



Since the emphasis of this book is on self-directed learning, in looking at study skills for we will focus on 'self-study' skills.

In the earlier section we noted Carol Dweck's studies that effort and not a false sense of innate intelligence determines sustained good performance. Good students are honest enough to acknowledge their deficiencies and courageous enough (emotional resilience and grit – traits we discussed in the learning to learn section) to work hard to rectify them.

Just as an athlete has to train frequently and a musician has to practice regularly, students need to cultivate good study habits and study daily. There are no shortcuts.

The objective for a student, in a formal education setting like school or University, is to be properly prepared for each class. For this students need to work before a class, during a class and after a class. Let's examine what work a student needs to do in each of the three stages.

Before Class

As a good student you need to show up for each class well prepared and ready to learn. For this you need to know what topic will be covered in the class beforehand, read about the topic and make notes before the class. Your syllabus will tell you broad topics that will be covered during the academic year and most likely your teacher or lecturer will tell you exactly what will be covered in the next class.



Active Reading

Once you know what topic will be covered you need to read about the topic before you come to class. This could be a reading from a prescribed textbook at school level or a reference book at University level.

When you read a book make sure you don't read it passively or mindlessly. Actively engage with what you are reading. In your head, have a dialogue with the author. Agree or disagree with the author, ask questions and see if your questions get answered (if not, then these become questions you should ask your teacher in the next lecture).

Annotating

While you are reading look for important information in the text and underline these lines. Note your immediate thoughts and questions in the margin of the book (do this in a notebook if you are using a book you have borrowed from the library).



Note Making



Maintain a
Learning Journal

Maintain a 'Learning Journal' and for whatever you are reading try to answer three questions – what does the text say, what does this mean and how does this relate to something you already know.

To help comprehension pause often while reading and summarize in your own words what has been said and what you understand of it. You can also make pictures, diagrams and mindmaps of this summary. Be selective in your note taking – don't copy word-for-word from the textbook, instead summarize in your own words.

You can also use the KWL strategy for taking notes. Make three columns and note information under three headings - 'Know' (your summary of what you have read and if you are able to connect it with something you already know), 'Want to Know' (your questions or things you don't understand) and 'Learned' (this column you will fill after the class once you have discussed the topic with the teacher or with other students).

During Class



Enter the class with some knowledge of the topic that is to be covered and knowing what you don't know about the topic – the 'Want to Know' part of your notes. After the class it should not be that the only thing you know is that you don't know anything!

Actively participate in the class

Don't wait until class to hear difficult concepts for the first time. Learn to anticipate and prepare in advance so that your engagement during class is at a deeper level.

During class keep your head up and don't mindlessly write everything that is being said. Instead refer to your Learning Journal and when the teacher explains a concept you already know about then put a tick or underline that point so that you know it was covered in class.

If the teacher adds something new which you don't have in your Learning Journal then make a note of it. Using colour coding is useful – one colour for notes you made at home and another colour for new stuff that you learnt and noted in class.

Engage with the lecture as you engaged with the book. Keep asking yourself whether you agree or disagree with the teacher, ask questions and clarify your doubts. Make sure that by end of the class you have answers to the 'Want to Know' column of your notes. These will go in the 'Learned' column.

After Class

Review your notes. See the notes from the perspective of the exam. If you have access to past year question papers you can see what sort of questions are asked on the topic and check if your notes help you answer these questions. If required, make additional notes from exam perspective. If you don't have past year question papers you can try the exercises for that topic given at the end of the chapter in the textbook.

Prepare for the next class!

Study Groups

You can also form a Study Group that meets regularly. In a study group, instead of engaging with the topic just by yourself, you engage with the topic as a group. Thus, one person may read the text aloud, another person may summarize the text, a third person may add in case any point has been missed and questions could be discussed with the whole group. Roles may be changed during a group study session.



Form a Study Group

The most important thing in group-study is not to lose focus of the objective and not to digress off topic.

Planning and Creating a Schedule

Preparation before a class is usually easy to do when you don't have too many things on your plate. But as the term proceeds you invariably find that you have more than one deadline to meet – homework to do, essays to write, tests, participation in co-curricular activities and more.

To stay on top of things you need to have good Planning and Scheduling skills.

To prepare a Master Study Schedule first make a note of all the activities you do everyday in a typical week. This will give you a sense of how much time goes in which activity and what time slots are available for study. Usually you do get 20-25 hours each week, beyond school or college routine. Learn to make efficient use of this time.

Make sure you know what assignment or other work is due when and what you need to do for it. Also make sure you have a good sense of what topics will be covered in each subject in the next couple of weeks (whatever maximum future visibility you can get).



Based on time slots available and knowledge of what is due when and what you need to study before and after classes make a Master Study Schedule. The Master Schedule could be for two weeks to one month and as you have clarity on new deadlines they get added to the Master Schedule.



The Weekly Schedule will be more granular and should detail out hourly activity. You should also make daily To Do list. This list should be made at the end of each day for the subsequent day. This way you will have clarity on what exactly you need to do before start of each day.

Prioritization

At times new assignments or other activities may suddenly creep in that have not been scheduled. For times like these you need to know how to change and set new priorities.



Usually the best way to figure out priorities is to work out the downstream consequences of each action point. For example, if you had slotted research work in the library for an essay in your schedule but you suddenly learnt that there is a lecture by a guest faculty during the same time, you need to work out the impact of attending the lecture on your scheduled activities and figure out whether you can compensate elsewhere. Your priorities can be changed based on the importance and impact of the new activity on your schedule.

Overcoming Procrastination

Usually everything looks possible tomorrow but nothing looks possible today! Beware of this habit of postponing things for the next day. Too much will pile up and anxiety will further complicate matters



‘Little and Often’ is the best strategy when it comes to learning. An hour of study everyday is more doable and more effective than planning seven hours of study during the weekend.

Setting Goals

You can charge yourself up by setting goals that you cherish and those that will benefit you in the long run. Goals have a reciprocal attraction and they pull you towards themselves.

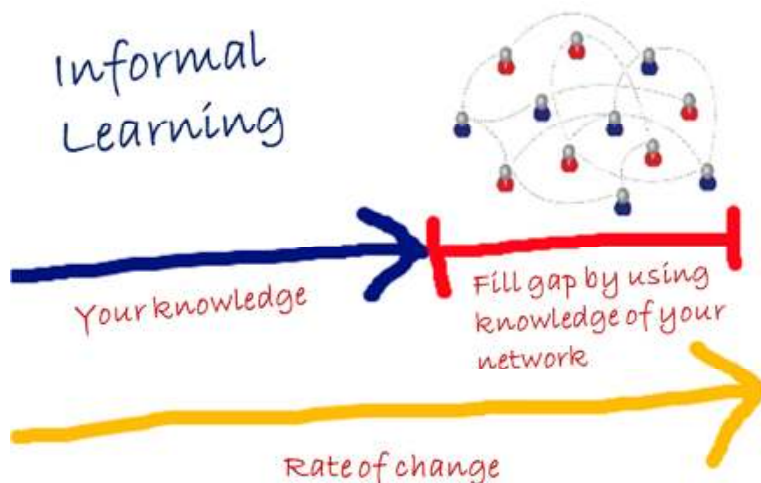
Create a virtuous circle for yourself:

- **Set Goals** – small weekly goals (e.g. study schedule), mid-term goals (e.g. exam preparation) and long-term goals (e.g. getting admission into a higher education institute of your choice).
- **Cultivate Good Study Habits** – planning, scheduling, active reading, annotating, note-taking.
- **Work Hard & Smart** – make sure you stick to your schedule and learn to prioritize.
- **Celebrate Success** – achieve and celebrate small successes (like treat yourself to a goody when you meet a short-term goal).



- **Self-confidence** – these small successes will boost your self-confidence and this will motivate you to do more.
- **Set a Higher Goal** – or use the self-confidence and motivation to pursue your mid-term and long-term goals.

Informal Learning



In today's environment where information is increasing at a very rapid pace often times you need to perform without complete understanding of the issue at hand. This is especially true for post-formal education, when you are in a work environment. In such a scenario, informal learning skills that help you acquire and make sense of information much faster than in formal learning environments, becomes a critical skill.

According to corporate anthropologist, Karen Stephenson, "Experience has long been considered the best teacher of knowledge. Since we cannot experience everything, other people's experiences, and hence other people, become the surrogate for knowledge. 'I store my knowledge in my friends' is an axiom for collecting knowledge through collecting people."

According to George Siemens, author of a paper titled *'Connectivism: A Learning Theory for the Digital Age'* and the book *'Knowing Knowledge^{xvii}'*, learning needs a coherent narrative but technologies like internet fragment knowledge. 'Connectedness' i.e. how one learner connects with other learners or experts helps in creating coherence in the fragmented learning space. Tools like Wikis, Blogs and eLearning Platforms hence become tools for sense making because they are effective information interrogation systems and provide a social overlay to otherwise fragmented information.

Siemens writes, "Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn are more important than our current state of knowing."



Connections can thus be viewed as distributed cognition. The connections you have help you test your ideas. If you have a wrong belief or are construing wrong meaning your connections help you course correct. Connections provide you different perspectives and help deepen understanding. Technology today allows you to formulate wide connections, fast through tools like Facebook, Twitter, Scribd and SlideShare.

According to Siemens, “Our ability to learn what we need for tomorrow is more important than what we know today. A real challenge for any learning theory is to actuate known knowledge at the point of application. When knowledge, however, is needed, but not known, the ability to plug into sources to meet the requirements becomes a vital skill.”

Online Informal Learning



Your online informal learning journey can begin, for example, by visiting the Wikipedia pages on the topic you want to study. Chances are you will get links to further reading material on Wiki page and some of these may be links to other web pages.

You could also search YouTube for video content on your selected topic. What I personally find useful is to note from the Wiki page names of experts on that topic, or famous books. I then search Google for that expert or that book.

Since my preference is to listen to video lectures, I filter the Google results for the expert or the book by selecting 'videos' button on the left navigation on Google.

Google allows you to further filter video content based on duration, quality, source and other attributes. So if you really want to dig deep into a topic filter the video search results to display videos that are longer than 20 minutes. This way you normally get more serious content and less of the frivolous content that YouTube usually offers at first blush.

You can also search iTunes University for related podcasts, MIT World for their video content and websites like TED.com and AcademicEarth.org.

You can also search blogs and document repositories like Scribd. To check out books you can use Google Books, or Amazon's 'look inside' feature. If you want to buy a few books but are not sure which one's are most relevant then you can rely either on 'wisdom of the crowd' feature on Amazon and sort book results based on 'average user rating' or you can use Amazon's recommendation system - 'people who read this also read'. The recommendation system also displays average user rating. Both together are usually very good indicators of useful content.

Look for second hand book deals on Amazon as sometimes you can get a really good bargain. Kindle editions are cheaper than print editions. If you don't have Kindle but are ok to read on-screen then Kindle App is available for PCs, Macs, iPhones, iPad and Android phones. I have read a couple of Kindle books on my Android phone and if you are ok to read onscreen then the experience is not bad.

Social Bookmarking sites like Digg and Delicious are another medium for locating relevant content. You should also check out specialized websites like TechCrunch for news on technology, or websites of relevant industry associations or government agencies. You could also use RSS and Google Reader to get content ‘pushed’ to you.

I used the above techniques to find books, videos and other content for this book.

If you prefer to listen to an erudite professor but can’t find relevant content on sites like Academic Earth and iTunes University then you can check out Teaching Company videos. They are a bit pricey but excellent content. Each of their courses goes on sale at least once a year so keep on the look out for bargains.

While you are perusing through content it makes sense to make your own notes, or use tools like mindmaps.

Social Media and Informal Learning



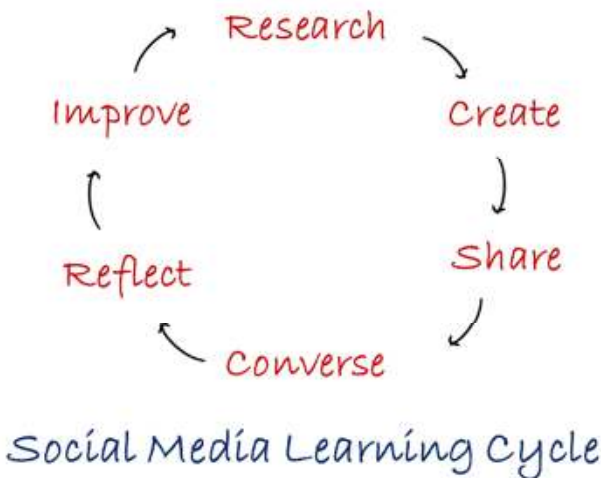
Joining an online community of people who are also interested in the same topic is quite useful. You can find such communities on sites like Facebook or LinkedIn and join the conversation.

Alternately, if your batch mates or colleagues are also pursuing similar topics then it makes sense to start your own online group using free tools like Google Groups or Yahoo Groups or even a Facebook page. This will be like having a known online study group of your own.

Conversations and participatory learning, if done well, can really deepen your understanding.

Using Twitter to tweet your thoughts on a particular topic can help you put your thoughts together. Maintaining a blog implies that gradually you build your own knowledge repository.

Thus, you can use social media to help you in your learning journey right from researching and finding content, to composing your thoughts using micro-blogging tools like Twitter or status messages on Facebook, to putting more detailed essays on your blog, to starting a conversation on Facebook.



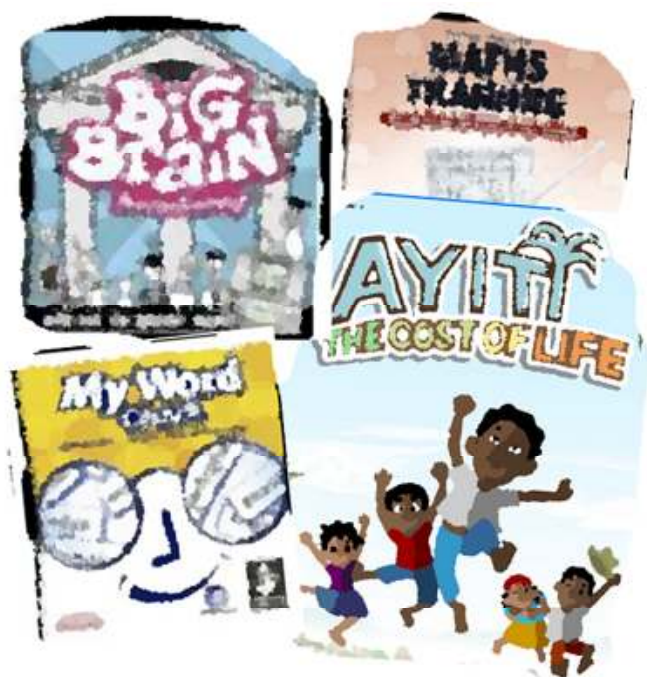
The learning cycle here is:

Research > Create > Share > Converse > Reflect > Improve

Serious Gaming

Serious gaming is a genre that is gradually becoming popular. I think the concept of 'Apps' – Apple or Android, will make this kind of learning even more popular and exciting.

If you have a compatible device – iPhone, iPad or an Android Phone check out their app store for apps on your topic of study. You may find some good content or if you are really lucky then perhaps even a well-made game. Apps are usually not that expensive.



Educational & Serious Games

If you don't have a compatible device even then search for serious games available for PCs and Macs.

Serious games are also available on game consoles like PlayStation, DS, Wii and Xbox. Brain Training, Art Academy, My French Coach are some of the titles available for Nintendo consoles.

The magazine 'The Economist' in collaboration with the oil company Chevron has made a game called 'EnergyVille^{xvii}' where you are the planner and have to meet the energy demands of a modern city. You have to decide on energy sources and make other decisions such that you keep the population of the city prosperous, secure and maintain clean environment.

UNICEF has created a game called Ayiti^{xviii}, which is a role-playing game. As one of the family members of a family living in abject poverty you have to take decisions and these will in-turn determine if your family prospers or dies. The game sensitizes the players about how hard life is when you are very poor.

'Institute for the Future^{xix}' has created massive, online collaborative games based on real-world problems. One of them is called 'World Without Oil', another one is 'Superstruct' where the premise is that world is going to collapse in 23 years and the online players (collaborators) have to come up with ways to invent the future of energy, food, health, security and social safety, and the third game is called 'Evoke' which is based on the African proverb, "If you have a problem, and you can't solve it alone, evoke it".

Mobile Learning

Mobile learning indeed makes anytime, any place, any pace learning really happen. If you are comfortable reading on-screen or listening to audio (audio book or a podcast) then using a mobile phone for learning can make you very efficient by helping you learn in what otherwise would be down time. For example, using the down time on a long flight when you don't feel like reading or the time you spend driving to work (though CDs may be a better choice in this case).

Audible is a great place for audio books. If you can manage listening to at least one audio book a month then you can get some great bargains at Audible by taking a monthly membership.

Even otherwise there are lot of podcasts and audio lectures available online for free. You can download these on your mobile device and listen to them whenever you have a little time available. Remember, little and often really pays in the long run.



Besides listening to audio you can also use mobile phones to read e-books, or to use relevant apps, or to browse the web – depending on the type of mobile phone you have.

Put your Cognitive Surplus to Good Use

According to Clay Shirky, author of the book 'Cognitive Surplus^{xx}', with the advent of online tools that allow new forms of collaboration, people are now learning how to use their free time more constructively for creative acts rather than consumptive ones. The author acknowledges that some of these acts are very frivolous but on the whole the trend is leading to valuable and influential forms of human expression.

It is pertinent here to note what Nicolas Carr has to say in an article titled, 'The Web Shatters Focus, Rewires Brain^{xxi}', which appeared in the 'Wired' magazine. According to Carr, the internet is making us 'hunter gatherers' rather than 'cultivators' in the realm of personal knowledge. Skimming is becoming the dominant mode of thinking.

The author notes that web browsing may strengthen brain functions related to fast-paced problem solving, particularly when it requires spotting patterns in a welter of data but cites research that shows every medium develops some cognitive skills at the expense of others.

According to Carr the depth of our intelligence hinges on our ability to transfer information from working memory to the long-term memory. But working memory can only hold a little amount of information at a time, plus a break in attention can sweep its contents from our mind.

When we skim through content on the web we may suffer from what the psychologists call 'cognitive overload' – when we are unable to retain information or unable to connect it with our prior knowledge. In such situations our understanding remains weak.

Added to this is the multitasking and hypertext environment of the web, which means that every break in our concentration burdens or wipes our working memory.



Skimming & multitasking may imply 'cognitive overload', loss of information or lack of comprehension

The mental consequences of online info-crunching are neither all good nor all bad. From spending your cognitive surplus on doing just consumptive activities like watching television, or watching YouTube, or any other 'mindless' activity (where you don't apply your mind), to researching, learning, creating, sharing, conversing and reflecting using online tools – the choice to use your cognitive surplus is your own.

To Understand



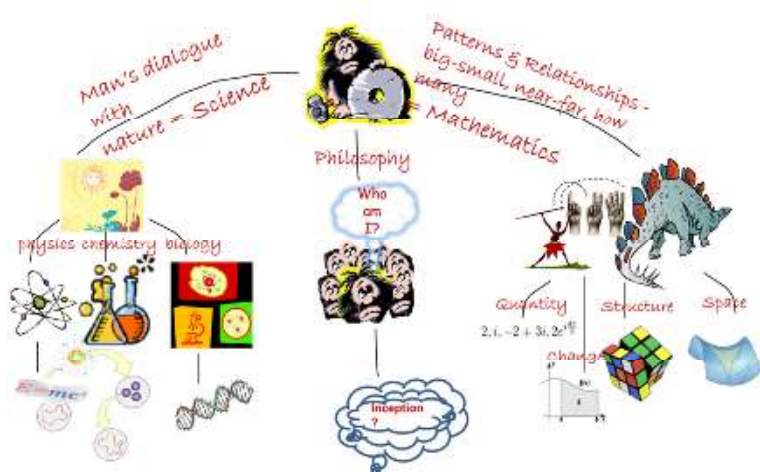
In this chapter you will learn

- What is understanding
- What is the 'disciplines' based way of understanding
- Framework for 'learning to understand'
- Role of intuition in understanding and when is intuition reliable
- Role of online learning and social media in participatory lifelong learning and understanding

What do we mean by ‘Understanding’?

You probably ‘know’ that $e=mc^2$ but do you understand what it means?

Humans have always endeavoured to understand nature, to muse on where we came from, what we find aesthetic and why. To facilitate this process of understanding we have created specific disciplines like science, history, philosophy, art and more.



A discipline includes methods of inquiry, linked concepts, theoretical frameworks, techniques for acquiring and verifying findings and ways of representing knowledge in that discipline including vocabulary, images and symbol systems.

As our knowledge and understanding of these disciplines has grown we have further fine-tuned these disciplines like genetics in the domain of biology, which is in the discipline of science; Second World War, in modern times, in the discipline of history, and so forth.

If we can look at the world, or any specific situation through multiple disciplinary lenses then we can acquire a deeper understanding and a better appreciation.

For example, 'The Art of Self-Directed Learning' could be viewed from a scientific lens, empirically observing how individuals learn, conducting MRI scans of the brain to better understand brain processes; or from a historic lens, the story of learning – how in earlier times learning was mostly around religious teachings and how stories and songs were used to impart knowledge, how the industrial revolution led to adoption of education techniques to impart basic skills to masses and how the current 'knowledge worker' needs skills that go much beyond the 3Rs.



At school level disciplines are usually taught in superficial ways. Focus is more on mastery of facts than mastery of a discipline and understanding how different disciplines give us different approaches for thinking about and examining the world.

According to Howard Gardner (of multiple intelligences fame) 'understanding' is the capacity to take knowledge, skills, concepts, facts learned in one context, usually the school context, and use that knowledge in a new context, in a place where you have not been forewarned to make use of that knowledge.

Gardner observes that most adults, except in area where they are experts, continue to think the way they did when they were five years old. Scholastic knowledge is what we are very good at doing in school; but unless that scholastic knowledge can be activated in new circumstances, it remains inert and essentially useless.

In 'A Private Universe' project on misconceptions about science, graduates from Harvard University were asked why is the earth warmer in the summer than in the winters (or why do we have seasons). 23 out of 25 students immediately gave the same answer that the earth is closer to the sun in the summer than it is in the winter due to the elliptical orbit of the earth. This argument does not hold water because if it were true then at that point in time both Southern and Northern hemispheres would have the same season and we know this is not true. This is an example of experts in one field (Harvard graduates in this case) thinking like a five-year-old.

According to Gardner the problem in science is misconceptions, the problem in mathematics is rigidly applied algorithms (formulas and not fundamentals) and the problem in humanities is stereotypical thinking, which is developed early in life.

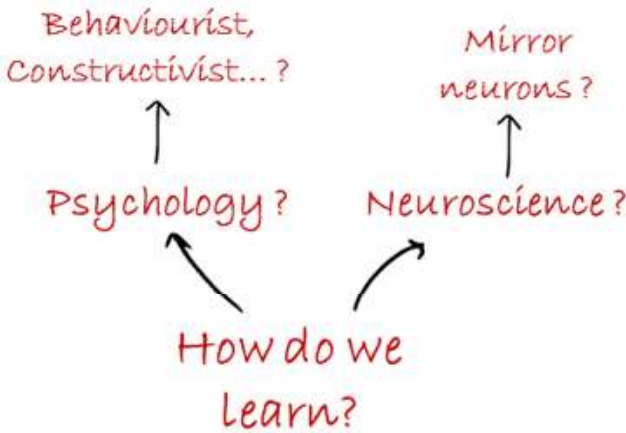
Learning for Understanding

In his book 'The Development and Education of the Mind^{xxii}' Gardner suggests the following framework for learning for understanding (as against learning just for knowing facts, formulas, concepts and other information).

1. Essential Questions
2. Multiple Entry Points
3. Telling Analogies
4. Approaching the Core / Multiple Representations

1. Essential Questions

The 'understanding journey' begins with curiosity. Humans have been deeply curious about issues like 'identity and history' – Who am I? Where do I come from? What is the group to which I belong? Or, 'relations to others' – what is fair? What is moral? How do you handle conflicts? Or curiosity about the biological world, the psychological world and the physical world and desire to understand forms, patterns, sizes.



When starting your learning journey on any topic you should spend a little time thinking how does the topic relate with fundamental questions or disciplines. Example, a math problem's genesis may lie in human curiosity to understand forms, patterns and relationship. Such initial think through will lead to a more sophisticated understanding of the particular question or topic.

Story goes Isidore Rabi, winner of the Nobel Prize for Physics, when asked how he became a scientist, replied, "My mother made me a scientist without ever knowing it. Every other child would come back from school and be asked, 'what did you learn in school today?' But my mother used to say, 'Izzy, did you ask a good question today?' That made the difference."

2. Multiple Entry Points

To deepen your interest and level of engagement look at a topic from as many of the following perspectives as possible.



i. Narrative: this entry point is highly suitable if you enjoy listening to stories. Look for narratives on your topic of study in the form of films, documentaries and stories. YouTube is a good place to start. For example, to learn more about self-directed learning you could look for biographies of people who are known to have deep understanding, or look for stories of psychologists who have shaped this domain – John Dewey, B F Skinner, Piaget, Howard Gardner and others. Or watch a movie like ‘Renaissance Man’.



ii. Quantitative/Numerical: If numbers, patterns and operations intrigue you then make these your starting point. To dwell deeper into self-directed learning you could look at various psychological studies like those of Dweck and Langer. Or, tabulate who scored what at school in your family and how their life stories have panned out to see if you can decipher correlation, causation and consequences between exam grades and life outcomes.



iii. Foundational/Existential: If 'bottom-line' or 'first principle' type of approach fascinates you then make this your entry point. For self-directed learning you could start with compiling the story of education – auditory traditions of the East, or the Trivium (grammar, logic and rhetoric) of Greece, need for religious indoctrination and demands of the industrial revolution to have masses of people with basic skills.



iv. Aesthetic: If works of art or harmony inspires you then you could start by making a mindmap of your learning journey or any other visual representation that helps you understand how you learn best.



v. Hands-on: If getting your hands dirty is what you enjoy most then make this your starting point. For self-directed learning search for free apps on iTunes Store or Android Market on learning and thinking skills. Or look for games on the topic you are studying. A new genre of 'serious games' has come into the market and perhaps there is a game that helps you improve your learning skills.

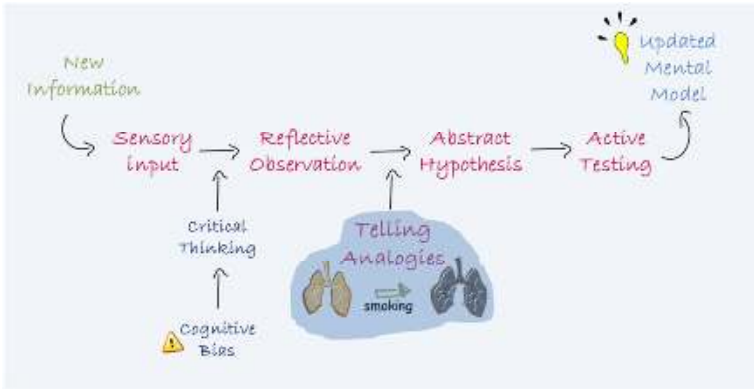


vi. Social: if you prefer learning in a group instead of all by yourself then use social media to your advantage. Look for online groups that you can join or start your own online study group, for example on self-directed learning.

3. Telling Analogies

An entry point to learning that arouses your interest will most likely lead to a cognitive commitment for further exploration.

According to Gardner after an appropriate entry point the learner should come up with instructive analogies, drawn from materials already understood, that can convey important aspects of the less familiar topic.



According to David Kolb, author of the book ‘Experiential Learning^{xxiii}’ the learning cycle (in a simplified form) constitutes – ‘Concrete Sensory Experience’, followed by ‘Reflective Observation’, followed by ‘Formation of Abstract Hypothesis’ (generalizing) and finally ‘Active Testing’ (application).

One key point in this learning cycle is the reflection phase when we connect new sensory input or new learning with what we already know (our existing knowledge or mental model), in order to make sense of the new input.

Making analogies by connecting new learning with what we already know is what leads to understanding of new materials we encounter. Analogies help us create or update our mental models.

Problems arise if our current knowledge or mental model is flawed like a misconception in science, rigidity in mathematics, or stereotypical thinking in humanities. We need to be sure that our mental models or heuristics (mental shortcuts) are not flawed or prone to cognitive biases.

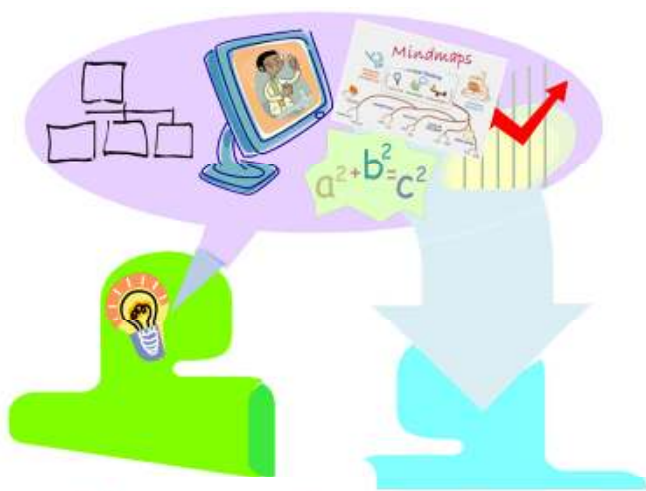
For this we need to better understand the process of critical thinking, where we deliberately look out for our cognitive biases, bring out our inherent assumptions in the open, look for alternative approaches, weigh the alternative approaches by analyzing the downstream consequences for each approach – to make sure our current thinking or current mental model is not flawed.

For example, we may hold an opinion that people who slog are not intelligent and hence if we have to put in extra effort to understand something new we jump to the conclusion that we are not smart enough. This notion that hard working people are stupid is our bias. We need to become aware that we hold such an idea and then inspect the idea from various perspectives to see if it is indeed true. For example, we may come to realize that we have to put in lot more work than a colleague but this is not because we are not smart but perhaps because we are not efficient in our study habits, or because our colleague has more grounding in that particular discipline and we need to put in more hours to catch up first.

4. Approaching the Core

Synthesis of knowledge is what leads to deep understanding.

According to Gardner, “The key step to approaching the core is the recognition that a concept can only be well understood – and can only give rise to convincing performances of understanding – if an individual is capable of representing that core in more than one way.”



Multiple representation of new knowledge
lead to better self-understanding and
help in conveying it to others

Multiple representations should go beyond analogies and where possible include representation systems from across disciplines – empirical observation, correlation, causation and consequences analysis, introspection on how the new learning impacts your life, why are you impressed (or not impressed) by the topic, aesthetic representation and other means.

Intuitive Learning

Some critiques of the disciplinary approach cite the role of intuition and how intuitive understanding is as important as a disciplinary approach to understanding.

Intuition is rapid sense making or rapid pattern recognition, also called 'thin slicing' or 'rapid cognition'. The concept of making instant decisions has been made popular by the book 'Blink'.

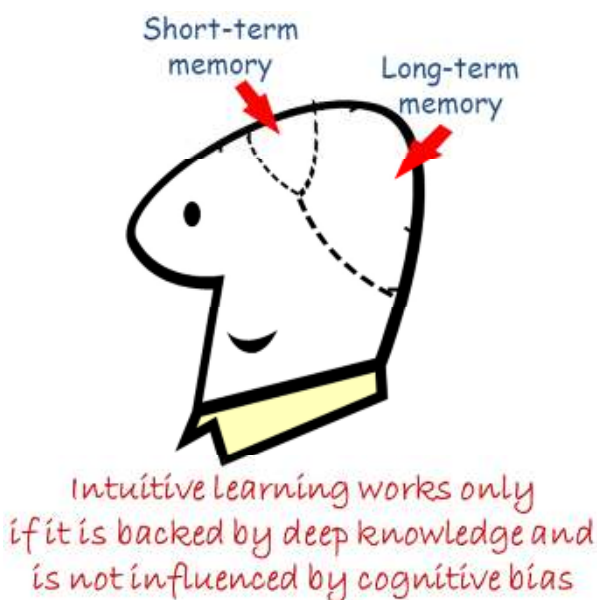
Rapid cognition usually works reliably only if deep knowledge and understanding already exist in that particular domain. For example, when Captain ‘Sully’ of US Airways took a split second decision to land his Airbus A320 airplane on the Hudson River, on the face of it, it was an intuitive decision but the intuition was reliable because behind it were thousands of hours of flying experience that helped Captain Sully quickly rule out options of returning to La Guardia or heading towards other airports and instead he decided to ‘ditch’ the plane in the Hudson River.

Rapid cognition may be better than a disciplined approach in cases where even after pursuing a disciplined approach there is a deep-rooted cognitive bias or misconceptions. In the book ‘Blink^{xxiv}’, author Malcolm Gladwell tells the story of a maestro orchestra conductor who believed that women could not play instruments as well as men but when during selection the maestro could only hear the artist and not see the artist he selected a woman artist. This is a case of deep rooted cognitive bias, further hardened by then prevailing misconception that women artists were not as good as men artists.

Thus, intuition is reliable when it is backed by experience and is not negatively influenced by individual’s cognitive bias.

In her book ‘The Power of Mindful Learning’ Ellen J Langer states, “The very notion of intelligence may be clouded by a myth: the belief that being intelligent means knowing what is out there. Many theories of intelligence assume that there is an absolute reality out there, and the more intelligent the person, the greater his or her awareness of this reality.”

She elaborates, “Many of us are still in search of the one right answer. This belief in the single right answer rests on a view of intelligence that emphasizes outcomes and expert authority. Intelligence is often seen as the capacity to achieve desirable outcomes. An outcome’s desirability, however, is dependent on context. An outcome that is good in one context may be most unwelcome in another. The capacity to achieve an outcome is different from the ability to explore the world and understand experience... If we can shed this outcome orientation, we may discover that the freedom to define the process is more significant than achieving an outcome that has no inherent meaning outside the particular setting.”



Thus, the answer is dependent on the context, and the context mostly gets determined by our frame of reference, which is in-turn usually determined by our conditioning – values, point-of-view, perspective that we acquired as we were growing up.

The challenge is to see the input (learning material) from several perspectives, hold our judgment i.e. not jump to conclusions based on our inherent frame of reference, see the information as novel by stepping back from both perceived problem and instant solutions and consider alternate possibilities.

According to Gardner, “An understanding and appreciation of a disciplinary approach to deep understanding is all the more important because traditionally schools and colleges have either relied on providing explicit understanding, usually through didactic means, and assessed understanding in terms of linguistic mastery of materials (example, by citing the definition of a concept, or testing for recall), or teachers have supplied copious information to students and hoped that, somehow, the students will forge their own synthesis.”

Patterns, Connections and Synthesis

With growing complexity of domains and humongous knowledge available in most domains it becomes imperative that a person follows a disciplinary approach and acquires deep understanding, of at least one discipline and then, if possible, of other disciplines, to create synthesis and make meaning by seeing connections and patterns.

A deep understanding of multi and meta disciplinary connections helps us look at the world in different ways and appreciate it more.

Big History^{xxv}

Prof David Christian who has pioneered a course he calls 'Big History', endeavours to explain the universe from the Big Bang till today. He starts with helping us adjust our spatial and temporal perspectives.

To explain the spatial perspective, he gives the example of an ant that has been living on a wrinkle of an elephant's ear. This ant's world is full of mountains, prone to constant earthquakes (elephants flap their ears to cool the blood flowing through their immense ears and this cool blood in-turn helps them keep their bodies cool) that have led to several of the ant's relatives perishing.

If this ant were to be taken on an ant-helicopter such that it could see more wrinkles, then the whole ear and then the whole elephant, it would be akin to humans thinking of the vastness of the universe. Christian notes that the ant may then think of moving north, to the elephant's head, which would be prone to less earthquakes!

To understand temporal perspective Christian gives the analogy of viewing time from the Big Bang till today as 13 years (representative of the 13 odd billion years since Big Bang). On this scale our current modern societies have been in existence for six seconds and a period like renaissance is less than the blink of an eye.

Big History approach is a super-synthesis of knowledge in various disciplines and such a mega-synthesis can help us understand nature and human evolution better.

Understand Understanding

To recap, start your learning journey by thinking how the topic of study relates to established disciplines and what fundamental question does it link with. Consider what entry point you will personally find fascinating so that you will commit more time and energy to your learning journey. Then think of examples, analogies and metaphors that help you make sense of the new information by linking it with what you already understand. Here, beware of misconceptions you may hold or deep-rooted cognitive biases you may have.



Finally, synthesize your knowledge and represent it in multiple ways to deepen your understanding. Look out for opportunities of performance, in situations different from the one where you learnt the material initially, to test how much you have mastered the learning materials. These opportunities could be project work you do, portfolios you create, debates you participate in, or creative works you develop for say your blog, website, Slideshare, Scribd or YouTube.

Role of Online Learning and Social Media in ‘Understanding’

Knowing about the diverse opinions on a particular topic helps in seeing the topic from multiple perspectives and this leads to deeper understanding. Technology today has made it simple and cost effective to connect with other learners and engage in conversations that help in getting multiple perspectives about a topic and validate and deepen our understanding.

Work of George Siemens on 'Connectivism' shows that although knowledge has become highly fragmented however conversations with fellow learners using online using social media, helps us integrate this fragmented knowledge and make sense of it.

Search Engines help you find sources of information.

Recommendation Systems ('people who read this also read...') and Reputation Systems (rating and ranking) help you filter content to find out material that is relevant to your context.

Social media like Wiki, Blog, Facebook or Twitter help you connect with other learners with similar interests. Co-learners add more meaning and context to learning resources by techniques like commenting, social tagging and annotating.

Socratic Dialogue could, today, be conducted online in a Community of Practice by connecting with people with different viewpoints. Interaction could be synchronous through live chat or videoconference, or be asynchronous, through threaded discussion forums.

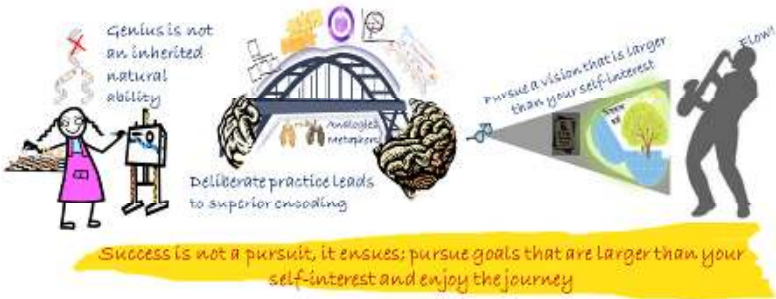
Tools like mindmap software can be used for organizing knowledge. Joint web quests and collaborative serious games can be used for interactive learning.

Online learning facilitates 'participatory lifelong learning', where learners can Imagine > Research > Create > Share > Converse > Reflect. The indwelling involved leads to synthesis and deeper understanding.



According to Siemens, “Connectivism presents a model of learning that acknowledges the tectonic shifts in society where learning is no longer an internal, individualistic activity. How people work and function is altered when new tools are utilized. The field of education has been slow to recognize both the impact of new learning tools and the environmental changes in what it means to learn. Connectivism provides insight into learning skills and tasks needed for learners to flourish in a digital era.”

To Perform



In this chapter you will learn

- How you can use assessment as a tool for learning
- How do you assess understanding
- How can you achieve personal mastery
- How age does not matter when you are pursuing excellence
- What is 'deliberate practice' and why is it important
- How to be totally involved while performing and achieve that exhilarating feeling of transcendence
- The importance of pursuing goals that go beyond your self-interest

Imp

We will look at ‘performance’ from three perspectives,

- Assessment
- Personal Mastery
- Flow

Assessment

Performance could be assessment of knowledge or assessment of understanding.

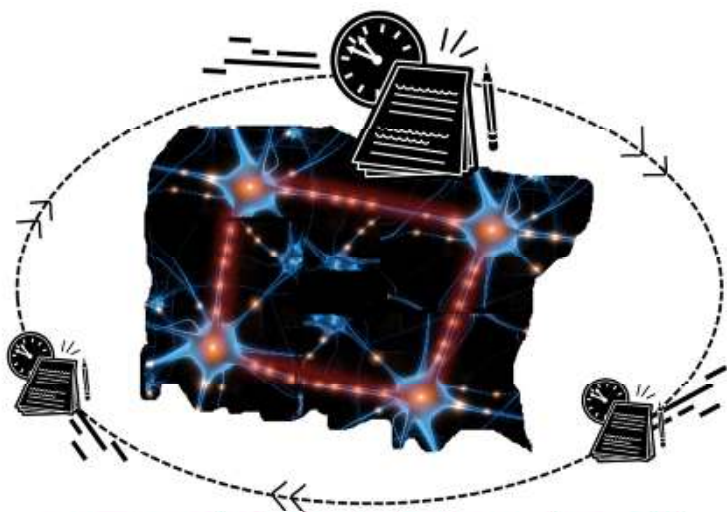
Assessment of Knowledge

The sentiment these days is that assessment of knowledge, which happens during examinations at school and college level, serves no purpose.

However, according to an article in New York Times, ‘Forget What You Know About Good Study Habits^{xxvi}’, “Cognitive scientists see testing itself — or practice tests and quizzes — as a powerful tool of learning, rather than merely assessment. The process of retrieving an idea is not like pulling a book from a shelf; it seems to fundamentally alter the way the information is subsequently stored, making it far more accessible in the future.”

The article quotes Henry L. Roediger, a psychologist at Washington University in St. Louis, “Testing has such bad connotation; people think of standardized testing or teaching to the test. Maybe we need to call it something else, but this is one of the most powerful learning tools we have.”

The article explains, “One reason the thought of testing tightens people’s stomachs is that tests are so often hard. Paradoxically, it is just this difficulty that makes them such effective study tools, research suggests. The harder it is to remember something, the harder it is to later forget. The more mental sweat it takes to dig it out, the more securely it will be subsequently anchored.”

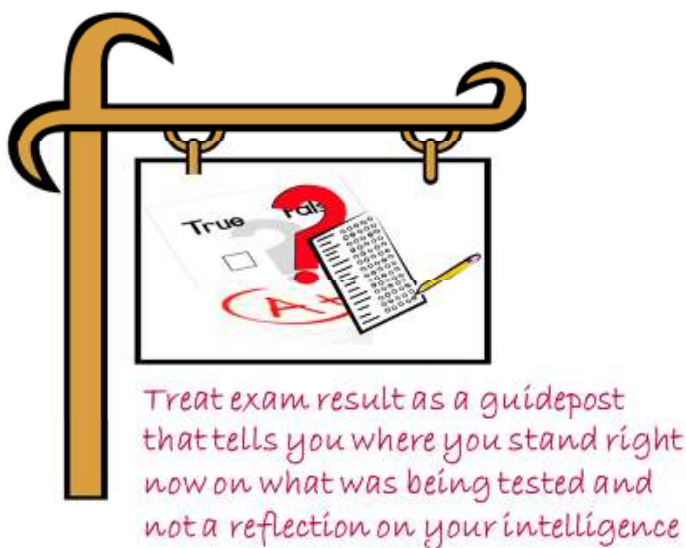


Tests have a bad reputation but they can be powerful tools for learning. Preparation and mental sweat for tests securely lodges the information in your memory

Make tests and exams your friends in learning and treat them as opportunities to improve your performance. Treat test results as guideposts in your learning journey and not as evidence of your intelligence or ability. At best the results tell you your performance as at that point in time, they may not reflect ability or potential.

Even if you get good results be wary of developing a mindset that makes you afraid to take on new challenges lest you don't live up to similar good results.

It is also possible that the test you take focuses on one particular ability or intelligence, for example most school level tests focus on test of memory and logical thinking ability. Be aware of what is being tested and treat the outcome as evidence of only that ability and not a statement of your general ability or intelligence.

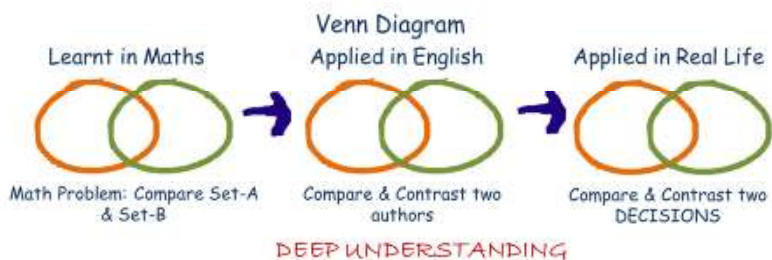


Assessment of Understanding

Howard Gardner, in the book 'Development and Education of the Mind – Selected Works' says, "I have ambivalent feelings about testing, but little ambivalence about assessment." He defines assessment as obtaining of information about the skills and potential of individuals, with the dual goals of providing useful feedback to the individual and useful data to the surrounding community.

Demonstration of deep understanding of a topic is what is of most consequence in the long run. Deep understanding happens when you can apply the knowledge learnt, in a novel situation, for which you had not specifically prepared yourself. In other words application of knowledge in a real-life situation determines understanding.

If it is not feasible to apply knowledge in a real-life situation, you should try creating life-like situations through projects, portfolios, games, debates and discussion.

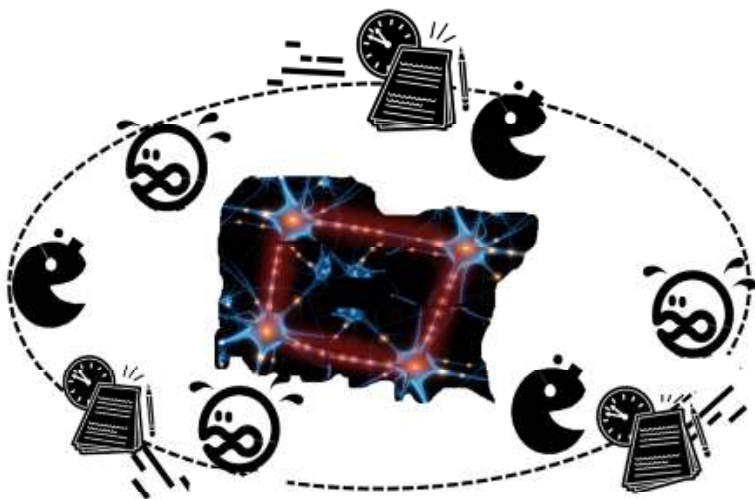


One can argue that standardized tests are objective and other forms of assessment like projects and portfolios tend to be subjective. However, setting parameters and criteria for assessing projects and portfolios may be a better approach than to do away with such assessment because of possible subjective bias.

As a self-directed learner, to further your knowledge and deepen your understanding, besides treating tests as your friend in your learning journey who tells you where you stand at that point in time and does not pass a judgment on your general ability and intelligence, you should also create your own projects and portfolios. You could write an essay on something you have learnt, or create a presentation, or write a blog post, or share your views in an appropriate online forum, or make a mindmap, or any other activity that helps you apply what you have learnt in a context close to real-life situation.

Remember that life is a continuous learning process. Treat tests and assessments as guideposts in your learning journey that help you course correct.

According to Josh Waitzkin, author of the book 'Art of Learning', "When you are competing at highest levels the knowledge is equal amongst the competitors, what separates good from great is who has better mental stamina."



Use tests to become better at dealing with emotional tension; stress & Recovery helps build mental stamina

Waitzkin suggests 'stress & recovery' as a way to build mental stamina. He explains that one must get better and better at releasing emotional tension (*more about emotional tension is in the next section – Personal Mastery*).

According to Watzkin, "Growth comes at the point of resistance. Pushing ourselves to find what lies at the outer reaches of our ability."

Treat tests and assessments as opportunities to deal with emotional tension, a chance to practice stress & recovery – and build your mental stamina.

Waitzkin adds that we have to be able to do something slowly before we can do it quickly. But eventually we integrate the principles into our subconscious mind where we can draw on them instinctively and rapidly without conscious thoughts getting in the way. This deeply ingrained knowledge base can serve as a meaningful springboard for more advanced learning and action.

According to Waitzkin the steps to high-level learning and performance are – delve into the essential aspects of a small pool of basic information that is foundational to your chosen topic or field and do so in a manner that is in keeping with your unique learning style (*'unique learning style' is similar to 'different entry points' approach suggested by Howard Gardner*); building on this base, devote yourself to exploring new, ever more advanced sets of information and technique that lie at the outer edges of your ability or understanding (*tests and assessments can play a role here*); alternate such periods of pushing yourself to your limit with periods of rest and relaxation that foster recovery and creativity.

Personal Mastery

In his book 'The Fifth Discipline^{xxvii}' Peter Senge describes mastery as a special level of proficiency. A master craftsman does not dominate pottery or weaving but the craftsperson's skills allow the best pots or fabrics to emerge from the workshop.

According to Senge, people with a high level of personal mastery live in a continual learning mode. They never arrive. Personal mastery is a process, a lifelong discipline. People with a high level of personal mastery are acutely aware of their ignorance, their growth areas, yet they are deeply self-confident. For them the journey is the reward. They commit to goals larger than their self-interest.

To continually expand your personal mastery of a discipline or life pursuit, the first ingredient is a vision. A vision is not a goal it is derived from sense of purpose, an individual's sense of why the individual lives. Vision must have an underlying sense of purpose. Conversely, purpose without vision has no sense of appropriate scale. Vision gives energy, enthusiasm and ability to persevere even in the face of frustrations and setbacks. Vision pulls you towards itself.

Clarifying vision is relatively easy, facing current reality proves a greater challenge. As you develop a vision you also become acutely aware of the gap between your vision and your current reality. These gaps can make a vision seem unrealistic or fanciful and discourage you.



Stockdale Paradox

In the book 'Good to Great^{xviii}', author Jim Collins writes about what he calls the Stockdale paradox. Admiral Jim Stockdale who was a prisoner-of-war during the height of the Vietnam War, was tortured over twenty times during his eight-year imprisonment from 1965-1973. Stockdale lived out the war without any prisoner's rights, no set release date, and no certainty as to whether he would even survive to see his family again.

As the senior-most officer he was in command of all the prisoners in the camp. He did everything he could to create conditions that would increase the number of prisoners who would survive unbroken. At one point, he beat himself with a stool and cut himself with a razor, deliberately disfiguring himself so that he could not be put on videotape as a example of a well-treated prisoner.

He instituted rules that helped people deal with torture (after x minutes of torture you could say something because no one can endure torture for very long). He instituted an elaborate internal communications system to reduce the sense of isolation. The prisoners once tapped 'we love you' to Stockdale using mops while cleaning the central yard.

Jim Collins asked Admiral Stockdale how on earth did he deal with it when he was there and did not know how the story would end. Stockdale replied, "I never lost faith in the end of the story. I never doubted that I would get out."

Collins then asked the Admiral who didn't make it out. "Oh, that's easy," Stockdale said. "The optimists."

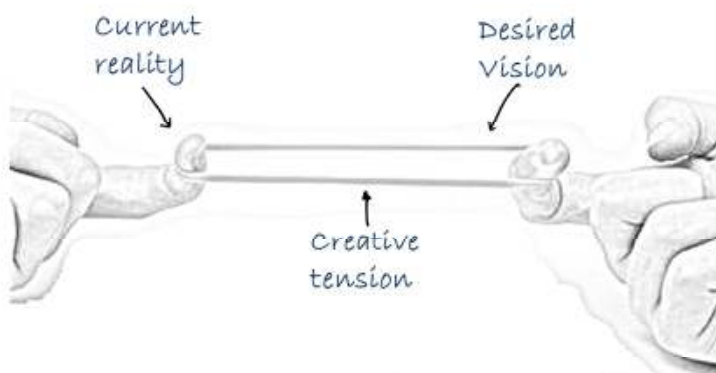
The optimists were the ones who thought they would be out by Christmas. Christmas came and went. Then they said they would be out by Easter and Easter came and went. Then Thanksgiving and it would be Christmas again. And the optimists died of a broken heart.

Admiral Stockdale comments, "You must never confuse faith that you will prevail in the end... with the discipline to confront the most brutal facts of your current reality."



Jim Collins calls this the Stockdale Paradox – "Retain faith that you will prevail in the end, regardless of the difficulties. And, at the same time, confront the most brutal facts of your current reality, whatever they might be."

Senge explains that there are only two ways to resolve the tension between your vision and your current reality – pull reality towards the vision or pull vision towards reality. Which occurs will depend on whether you hold steady to the vision. This gap is the 'creative tension'.



To resolve tension you can either pull reality towards the vision or pull vision towards reality

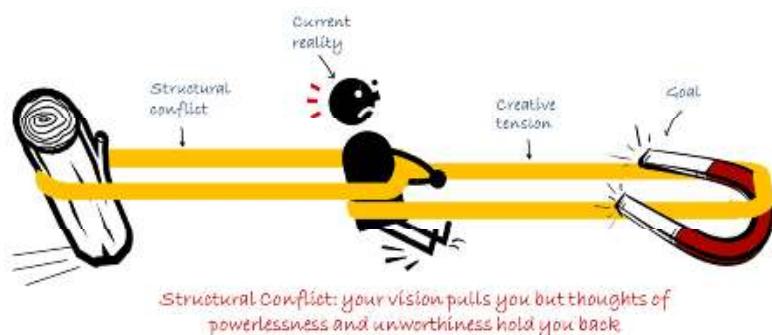
The creative tension often leads to emotions such as fear, anxiety, sadness, discouragement, hopelessness or worry but you should not draw the conclusion that creative process is all about being in a state of anxiety. This happens because when you try to raise your current reality to your vision it takes time and this time lag leads to emotional tension.

You should make the distinction between 'creative tension' and the 'emotional tension' because if you don't then you are more likely to lower your vision instead of raising your current reality. Goals towards achievement of your vision will erode if you have low tolerance for emotional tension. Dynamics of emotional tension are the dynamics of compromise, the path to mediocrity.

According to Robert Fritz, author of the book 'Path of Least Resistance'^{xxix}, "It is not what the vision is, it is what the vision does." Learn to use the gap between vision and reality to generate energy for a change. Senge comments, "Failure is simply a shortfall, evidence of gap between vision and current reality. Failure is an opportunity for learning it is not about unworthiness or powerlessness."

Fritz explains that all of us have a dominant belief that we are not able to fulfill our desires. This belief is an inevitable by-product of growing up – as children we learn what limitations are. Children are rightfully taught limitations essential to their survival. But too often this learning is generalized. We are constantly told that we can't have or can't do certain things, and we may come to assume that we have an inability to have what we want.

We limit our ability either because we believe we are powerless and incapable, or we believe we are unworthy – that we do not deserve to have what we truly desire.



Pause for a moment and think of all that you desire to achieve in your life –money, fame, bring about social change... and now ask yourself if you are capable of achieving this and deserving of it? Hear that inner voice inside you, it reveals your self-beliefs and very frequently these self-beliefs become self-limiting.

Fritz uses a metaphor to describe how contradictory underlying beliefs work as a system to counter achievement of goals. Imagine, as you move toward your goal, there is a rubber band, symbolizing creative tension, pulling you in the desired direction. But imagine also a second rubber band, anchored to the belief of powerlessness and unworthiness.

Just as the first rubber band tries to pull you toward your goal, the second pulls you back toward the underlying belief that either you can't, or you don't deserve to have your goal. Fritz calls this structural conflict.

In the book 'Art of Learning', Josh Waitzkin talks about 'The Downward Spiral' and explains that when we cling to the troubling emotions that result from a past obstacle or loss, we abandon the present for the past. In not being aware of the present, we magnify the original loss, allowing it to produce a ripple effect of additional problems. These, in turn, take us even further off a course of growth.

How can you deal with the structural conflict? According to Senge, it needs a relentless willingness to root out the ways we limit or deceive ourselves from seeing what is. The first step is to recognize the structural conflict such as when we find ourselves blaming something or somebody for our problems. Structures we are unaware of hold us prisoner. Once we can see them and name them, they no longer have the same hold on us. We realize that we have a choice, a choice to make a change.

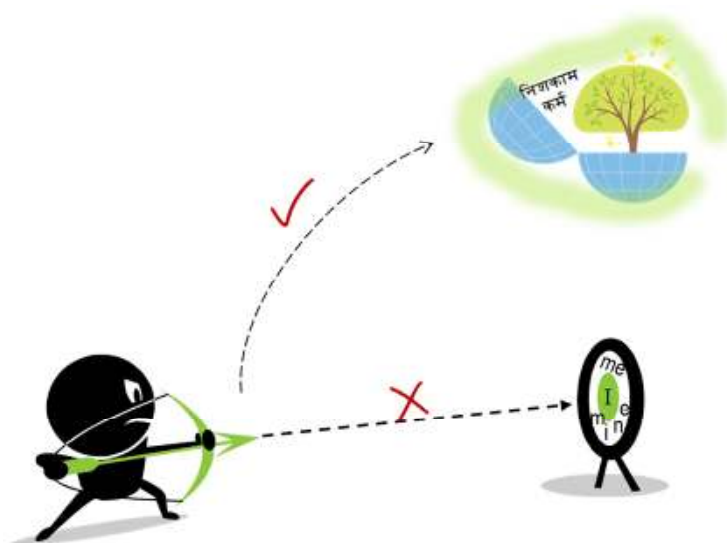
The Will to Meaning

In his book 'Man's Search for Meaning^{xxx}', famous psychiatrist and survivor of Auschwitz concentration camp, Dr Viktor E Frankl quotes Nietzsche, "He who has a *why* to live can bear almost any *how*."

Frankl observes that in a concentration camp every circumstance conspires to make the prisoner lose his hold. All the familiar goals in life are snatched away. What alone remains is "the last of human freedoms – the ability to choose one's attitude in a given set of circumstances."

Frankl recommends, "Don't aim at success – the more you aim at it and make it a target, the more you are going to miss it. For success, like happiness, cannot be pursued; it must ensue, and it only does so as the unintended side effect of one's personal dedication to a cause greater than oneself or as the by-product of one's surrender to a person other than oneself.

Listen to what your conscience commands you to do and go on to carry it out to the best of your knowledge. Then you will live to see that in the long run success will follow you precisely because you had forgotten to think of it."



Success, like happiness, is cannot be pursued; it must ensue, by dedicating yourself to a cause greater than your self-interest

According to Frankl, "Man's search for meaning is the primary motivation in his life. This meaning is unique and specific in that it must and can be fulfilled by him alone; only then does it achieve a significance which will satisfy his own *will* to meaning."

Young Genius or Old Master?

Is a creative genius a prodigy or does creative genius require years of nurturing before it blooms?

David W. Galenson, professor in the Department of Economics at the University of Chicago, has postulated a new theory of artistic creativity. Based on a study of the ages at which various innovative artists made their greatest contributions to the field, Galenson's theory divides creative people into two classes:

Conceptualists, who make radical innovations in their field at a very early age, and *Experimentalists*, whose innovations develop slowly over a long period of experimentation and refinement.

Conceptualists include,

- F. Scott Fitzgerald, who wrote *The Great Gatsby* at 29.
- Pablo Picasso, who painted *Les Femmes d'Alger* at 26
- Orson Welles, who made *Citizen Kane* at 26

Experimentalists include,

- Mark Twain, who wrote *Adventures of Huckleberry Finn* at 50
- Paul Cézanne, who painted *Château Noir* at 64
- Alfred Hitchcock, who made *Vertigo* at 59

In an article in Wired magazine titled “What Kind of Genius Are You^{xxx1}? - a new theory suggests that creativity comes in two distinct types – quick and dramatic, or careful and quiet”, author Daniel Pink describes Galenson’s work as ‘A Universal Theory of Creativity’.

Pink explains, “Pablo Picasso and Paul Cézanne are the archetypes of the Galensonian universe. Picasso was a conceptual innovator. He broke with the past to invent a revolutionary style, Cubism, which jolted art in a new direction. His *Femmes d'Alger*, regarded by critics as the most important painting of the past 100 years, appears in more art history textbooks than any other 20th-century piece.

Picasso completed *Demoiselles* when he was 26. He lived into his nineties and produced many other well-known works, of course, but Galenson's analysis shows that of all the Picassos that appear in textbooks, nearly 40 percent are those he completed before he turned 30."

Cézanne was an experimental innovator. He progressed in fits and starts. Working endlessly to perfect his technique, he moved slowly toward a goal that he never fully understood. As a result, he bloomed late. The highest-priced Cézannes are paintings he made in the year he died, at age 67. Cézanne is well represented in art history textbooks; he's the third-most-illustrated French artist of the 20th century.

But of all his reproduced images, just 2 percent are from his twenties. Sixty percent were completed after he turned 50, and he painted more than one-third during his sixties.

Picasso and Cézanne represent radically different approaches to creation. Picasso thought through his works carefully before he put brush to paper. Like most conceptualists, he figured out in advance what he was trying to create. The underlying idea was what mattered; the rest was mere execution. The hallmark of conceptualists is certainty. They know what they want. And they know when they've created it. Cézanne was different. He rarely preconceived a work. He figured out what he was painting by actually painting it."



Picasso painted his incomparable condemnation of the Spanish Civil War, *Guernica*, at the age of 56, which sounds contrary to what Galenson postulates. Galenson has refined his theory to make it less binary.

Pink notes, “Galenson now talks of a continuum – with extreme conceptual innovators at one end, extreme experimental innovators at the other, and moderates in the middle. He allows that people can change camps over the course of a career, but he thinks it’s difficult. And he acknowledges that he’s charting tendencies, not fixed laws.”

In the book ‘What the Dog Saw^{xxxii}’ author Malcolm Gladwell has a story titled ‘Late Bloomers’, which is also based on Galenson’s idea of dividing creativity into conceptual and experimental creativity.

Gladwell writes, “On the road to great achievement, the late bloomer will resemble a failure: while the late bloomer is revising and despairing and changing course. Late bloomers bloom late because they simply aren’t much good until late in their careers. Unlike prodigies late bloomers require forbearance and blind faith.”



On the road to great achievement late bloomers resemble a failure; unlike prodigies they require forbearance and blind faith

Gladwell comments, "Let's just be thankful that Cezanne didn't have a guidance counselor in high school who looked at his primitive sketches and told him to try accounting."

Gladwell adds that a creative mind that starts without a plan, and has to experiment and learn by doing, needs a patron, someone who will standby and support during the long and difficult time it takes for the creative mind of the late bloomer to reach its true level. He also notes that a late bloomer's success is highly contingent on the efforts of others.

So, if you have missed the boat and not become a child prodigy, or are overwhelmed by the mega success of the not-yet-thirty, despair not. Believe in your ability, whatever your pursuit stay relentlessly curious and constantly tinkering or as Pink puts it, "Like a dedicated tortoise undaunted by the blur of the hares." and success will be yours.

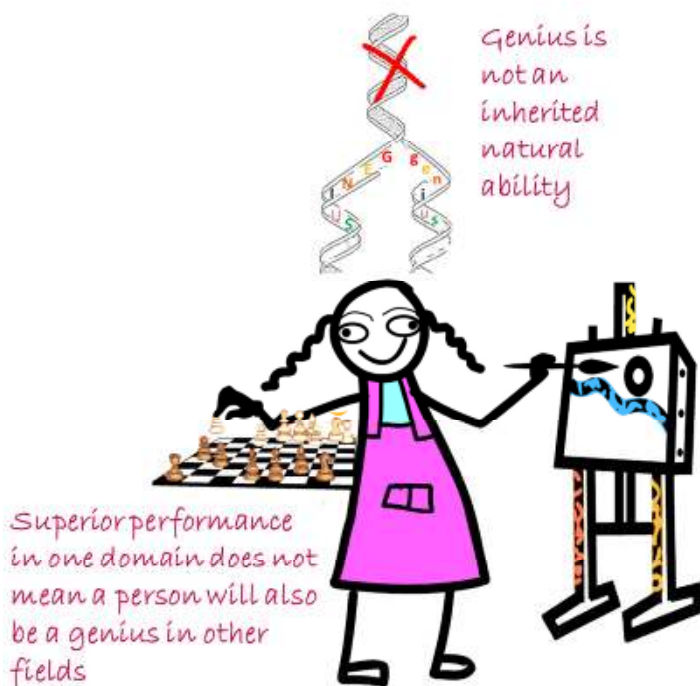
10,000 Hours of Deliberate Practice for Mastery

Sir Francis Galton was perhaps the first scientist to investigate the possibility that excellence in diverse fields and domains has a common set of causes. Galton found that eminent individuals in the British Isles were more likely to have close relatives who were also eminent. He concluded that eminence, that is, exceptional performance in a field, must be transmitted from parents to their offspring. Galton argued that eminence was a virtually inevitable consequence of inherited 'natural ability'.

Anders Ericsson, Professor of Psychology at Florida State University who is widely recognized as one of the world's leading theoretical and experimental researchers on expertise, in a paper titled 'Expert Performance and Deliberate Practice', says that, when experts exhibit their superior performance in public their behavior looks so effortless and natural that we are tempted to attribute it to special talents.

However, Dr Ericsson notes, "When scientists began measuring the experts' supposedly superior powers of speed, memory and intelligence with psychometric tests, no general superiority was found -- the demonstrated superiority was domain specific. For example, research has shown that the superiority of the chess experts' memory was constrained to regular chess positions and did not generalize to other types of materials.

Not even IQ could distinguish the best among chess players nor the most successful and creative among artists and scientists."



According to Ericsson and Lehmann,

- Measures of general basic capacities do not predict success in a domain
- The superior performance of experts is often very domain specific and transfer outside their narrow area of expertise is surprisingly limited
- Systematic differences between experts and less proficient individuals nearly always reflect attributes acquired by the experts during their lengthy training.

In an empirical study, de Groot instructed expert and world-class chess players to think aloud while they selected their next move for an unfamiliar chess position. The world-class players did not differ in the speed of their thoughts or the size of their basic memory capacity. Their ability to recognize promising potential moves was based on their extensive experience and knowledge of patterns in chess.

In their influential theory of expertise, Simon & Chase proposed that experts with extended experience acquire a larger number of more complex patterns and use these new patterns to store knowledge about which actions should be taken in similar situations.

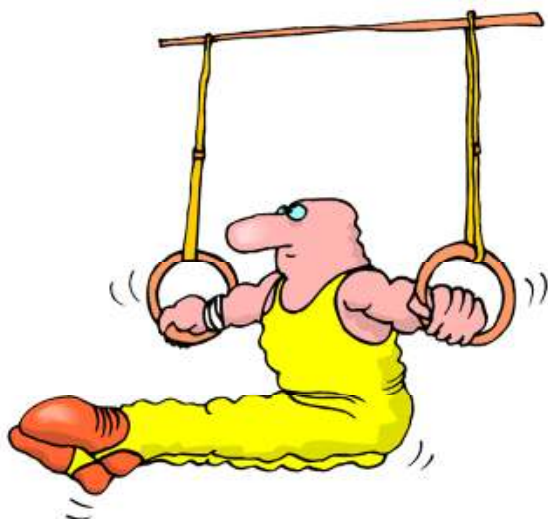
According to Ericsson & Lehmann beginners in a domain increase their performance for a limited time until they reach an acceptable level. Beyond this point, however, experience is a poor predictor of attained performance.



Continued improvement in performance is not an automatic consequence of more experience

Thus, continued improvement in performance is not an automatic consequence of more experience. Instead aspiring experts seek out particular kinds of experience and this is called 'deliberate practice'.

According to Ericsson, Krampe & Tesch-Römer, deliberate practice are activities designed, typically by a teacher, for the sole purpose of effectively improving specific aspects of an individual's performance. For example, the critical difference between expert musicians differing in the level of attained solo performance concerned the amounts of time they had spent in solitary practice during their music development, which totaled around 10,000 hours by age 20 for the best experts, around 5,000 hours for the least accomplished expert musicians and only 2,000 hours for serious amateur pianists.



'Deliberate Practice', i.e. activities designed solely for improving specific aspects leads to superior performance

Ericsson & Lehmann note that for complex problems experts don't just automatically extract patterns and retrieve their response directly from memory. Instead they select the relevant information and encode it in special representations in working memory that allow planning, evaluation and reasoning about alternative courses of action.

Less skilled subjects' knowledge, in contrast, is encoded using everyday concepts that make the retrieval of even their limited relevant knowledge difficult and unreliable. Furthermore, experts have acquired domain-specific memory skills that allow them to rely on long-term memory to dramatically expand the amount of information that can be kept accessible during planning and during reasoning about alternative courses of action.



Experts acquire domain specific memory skills and encode complex information in special representations that allows them to quickly access large amounts of information from long-term memory

The superior quality of the experts' mental representations allows them to adapt rapidly to changing circumstances and anticipate future events in advance. The same acquired representations appear to be essential for experts' ability to monitor and evaluate their own performance so they can keep improving their own performance by designing their own training and assimilating new knowledge.

The 10,000 hours of deliberate practice has been made popular by Malcolm Gladwell's book 'Outliers^{xxxiii}'. Gladwell gives the example of The Beatles, who performed live in Hamburg, Germany over 1,200 times from 1960 to 1964, amassing more than 10,000 hours of playing time, therefore meeting the 10,000-Hour Rule. Bill Gates, founder of Microsoft, met the 10,000-Hour Rule when he gained access to a high school computer in 1968 at the age of 13, and spent 10,000 hours programming on it.

In order to attain expertise or mastery, you need to put in 10,000 hours of deliberate practice, which is around 10 years with 4 hours of practice every day. You need to figure out ways to represent and store knowledge in your memory such that you can quickly and accurately retrieve it. And, as you develop expertise, use the same mental representations to monitor and evaluate your performance and designing more ways for assimilating new knowledge through better deliberate practice.

Flow

In his book 'Flow^{xxxiv}' Mihaly Csikszentmihalyi describes 'flow' as a state of joy, creativity and total involvement, in which problems seem to disappear and there is an exhilarating feeling of transcendence.



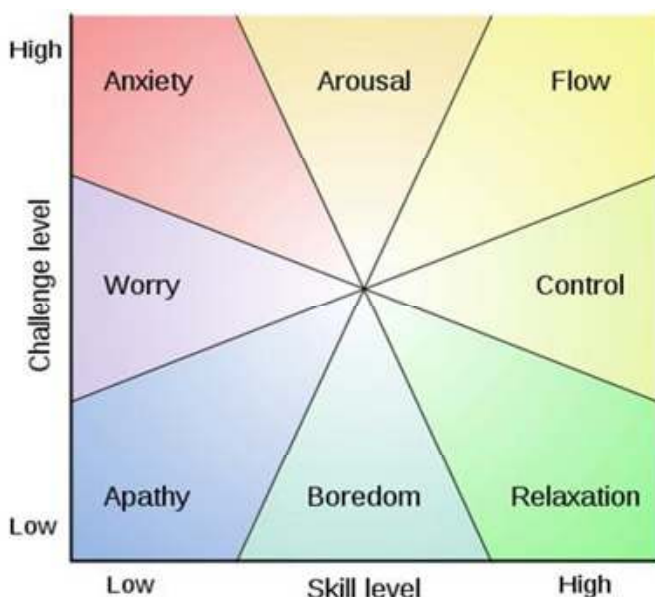
'Flow' is a state of joy, creativity, total involvement and a feeling of transcendence

A state of flow happens when you are so involved in an activity that nothing else matters. This state has also been described as 'being in the zone'. In flow the emotions are not just contained and channeled, but positive, energized, and aligned with the task at hand.

Flow is so named because many successful people interviewed by Csíkszentmihályi described their 'flow' experiences using the metaphor of a water current carrying them along.

A graph developed by Csíkszentmihályi (below) depicts the relationship between the perceived challenges of a task and one's perceived skills.

The center of this graph (where the sectors meet) represents one's current average level of challenge and skill. The graph shows that low skill and high challenge results in worry and anxiety; low challenge and high skill results in boredom and relaxation and so forth. The further away from the center an experience is, the greater the intensity of that state of being (whether it is anxiety or boredom or relaxation).



Flow can only occur when the activity at hand is a higher-than-average challenge (above the center point) and requires above-average skills (to the right of the center point).

Conditions necessary to achieve a state of flow include – involvement in an activity with a clear set of goals as this adds direction and structure to the task; a good balance between the perceived challenges of the task at hand and doer's own perceived skills; and, the task must have a clear feedback so that performance can be adjusted to maintain the flow state.

According to Csikszentmihalyi flow can be achieved in physical activities like sport, dance and music but also in mental activities like thinking and learning. He explains that when there is no demand on our attention mind reverts to its normal state of disorder i.e. random thoughts. Unless a person knows how to give order to his or her thoughts, attention will be attracted to whatever is most problematic at the moment: it will focus on some real or imaginary pain, on recent grudges or long-term frustrations. Entropy, a gradual decline into disorder, is the natural state of consciousness.

To avoid this condition, people are naturally eager to fill their minds with whatever information is readily available, as long as it distracts attention from running inward and dwelling on negative feelings. This, according to Csikszentmihalyi, explains why such a huge proportion of time is invested in watching television, even if it is rarely enjoyed.

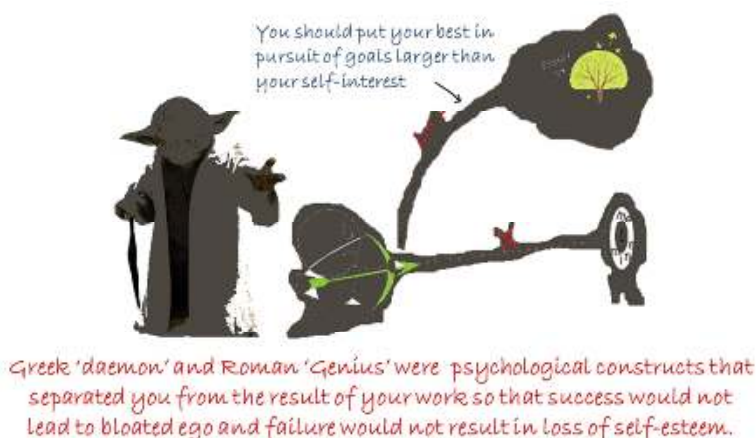
Csikszentmihalyi says that a better route for avoiding chaos in consciousness is through habits that give control over mental processes to the individual, rather than to some external source of stimulation. He cites the role of memory in establishing order in the mind and argues that even rote learning (much denigrated today) helps in controlling consciousness. Learning complex patterns of information by heart can also be a flow activity. In his book he also explains how study of language, logic, science, history and philosophy establish order in the mind and can become flow activities.

Csikszentmihalyi notes that many people give up on learning after they leave school because thirteen or twenty years of extrinsically motivated education is still a source of unpleasant memories. Attention has been manipulated long enough from the outside by textbooks and teachers. Ideally, the end of extrinsically applied education should be the start of an education that is motivated intrinsically.

At that point the goal of studying is no longer to make the grade, earn a diploma, and find a good job. Rather, it is to understand what is happening around one, to develop a personally meaningful sense of what one's experience is all about. From that will come the profound joy of the thinker.

How to Perform?

What Senge and Frankl describe about pursuing a noble vision, without regard to personal success, is also the message of 'Bhagwad Geeta', the Hindu scripture, which describes ideal action as 'Nishkam Karma' that is self-less action or pursuit of goals larger than your self-interest. Bhagwad Geeta also says that in pursuing goals that go beyond your self-interest you should not worry about the outcome or reward.



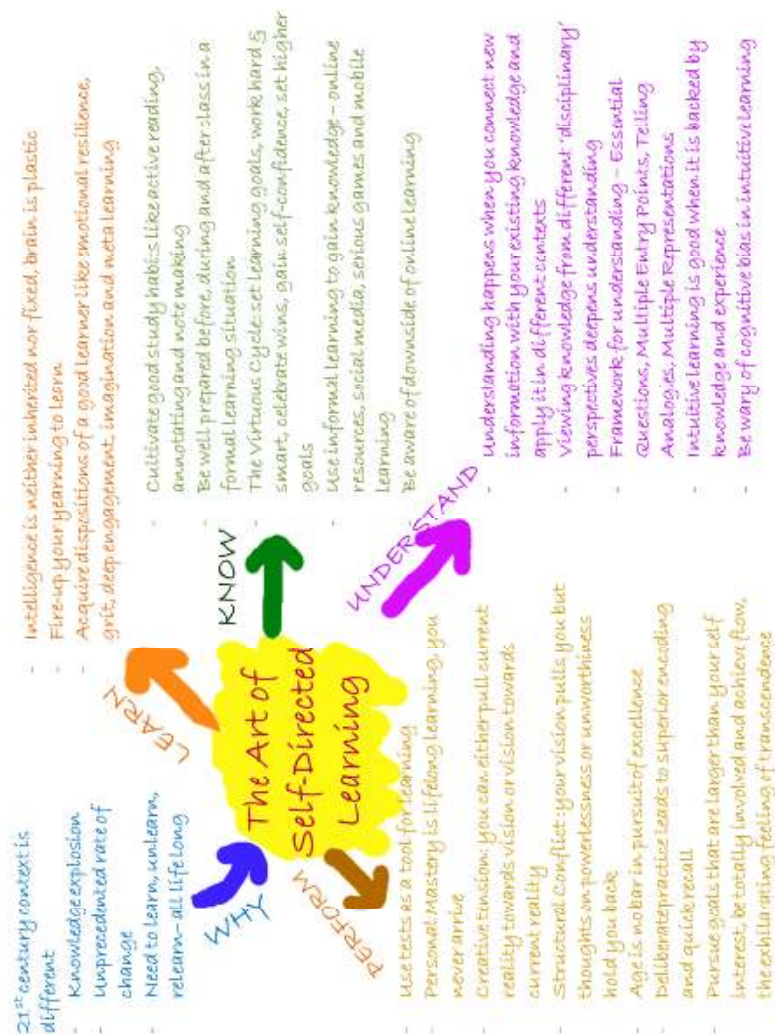
In ancient Greece and ancient Rome people did not believe that creativity or genius came 'from' human beings. Instead, they believed, creativity and genius came 'to' human beings from a divine attendant. The Greeks called this divine attendant 'Daemon'.

Socrates believed it was his daemon that spoke wisdom to him. Romans called the divine attendant 'genius', which would sort of invisibly come and protect you. This is similar to what Bhagwad Geeta says about detaching yourself from the outcome of your self-less pursuit.

We could think of Greek 'daemon', Roman 'genius' and Bhagwad Geeta's 'Nishkam Karma' as psychological constructs that separate you from the results of your work. Be it a huge success, in which case you are protected from the eventual negative outcome of narcissism and bloated ego, or a big failure, in which case you are protected from loss of self-esteem and negative emotions like anger and depression.

From ancient wisdom to modern writers, the message seems to be the same – pursue goals that are larger than your self-interest, let outcome be peripheral, focus instead on putting in better than your best, not losing your energy on negative emotions, and above all, enjoy the journey!

Art of Self-Directed Learning – At a Glance



Concluding Thoughts

Collective Learning, Collective Responsibility, Collective Wisdom

David Christian, in his book 'Maps of Time' explains that all living things learn how to extract energy from their surrounding in order to survive. Over time new species appear that have found new ways of extracting that is more efficient. For example, photosynthesis helped plants thrive and agriculture has made humans a successful species.

Christian further explains that most species adapt either through natural selection or through learning. In natural selection the DNA records natural advantage and passes it on to the next generation, but this is a slow and wasteful method of adapting because it is a random process of trial and error.

Animals with brains, say monkeys, can change behavior within their lifetime through learning. This is deliberate and more rapid process of adapting but learning can't be passed on genetically. Thus each individual has to more or less learn from scratch.

But humans have developed a third and highly potent way of adapting. Christian calls it 'collective learning'. Symbolic language has allowed humans to store knowledge, add to it and distribute it. Thus any advantage, in terms of more efficient ways of extracting energy from the surrounding can be learnt, stored, added to and distributed.

The advent of internet has taken 'collective learning' to a new orbit. Never before in the history of our planet has sharing of colossal amounts of knowledge been this easy, this fast and this wide.

However, when one species on the planet becomes significantly better than all other species in extracting energy from the surroundings it can cause severe damage to all other species. This is what we are witnessing, whether it be climate change because of human interference or massive loss of other species.

We humans have a tremendous responsibility to bear. We have to ensure that we use this never before possible 'massive collective learning' for the good of the whole planet. We have to understand our 'collective responsibility'.

As humans we go from being 'instinctive learners' during our infancy, when we learn almost unconsciously, to 'intellectual learners' who are conscious about what we don't know and make efforts to learn deliberately and finally to 'intuitive learners', who having acquired mastery and can perform almost sub-consciously.

The problems we face today are highly complex and some of them like climate change and nuclear threat can lead to massive annihilation. We owe it our planet to put our individual and collective learning capacity to pursue goals that go much beyond our self-interest and prove that in the 4.5 billion year history of this planet, we are a very responsible species.

For this, I think, as self-directed learners, adept at learning, knowing, understanding and performing, the next step will be pursuit of wisdom. To be a responsible species we need to go from collective learning to collective wisdom.

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Atul Pant: founded Timeless Lifeskills Limited, a UK-based company offering e-learning products on skills essential for surviving and thriving in the 21st century. In 2001 he had co-founded Enabling Dimensions, a company based in Singapore and India and providing bespoke e-learning and knowledge management solutions. Atul lives with his family in London.

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