

The Talent Code-Greatness Isn't Born. It's Grown. Here's How.

Daniel Coyle

Introduction

Myelin's vital role is to wrap those nerve fibers the same way that rubber insulation wraps a copper wire, making the signal stronger and faster by preventing the electrical impulses from leaking out. When we fire our circuits the right way-when practicing swinging a bat or playing that note-our myelin responds by wrapping layers of insulation around that neural circuit, each new layer adding a bit more skill and speed. The thicker the myelin gets, the better it insulates, and the faster and more accurate our movements and thoughts become.

Chapter 1-The Sweet Spot

You will become clever through your mistakes.-----German Proverb.

Deep practice is built on a paradox: struggling in certain targeted ways-operating at the edges of your ability, where you make mistakes-makes you better or smarter. Or to put it a slightly different way, experiences where you're forced to slow down, make errors, and correct them-as you would if you were walking up an ice covered hill, slipping and stumbling as you go-end up making you swift and graceful without your realizing it.

Things that appear to be obstacles turn out to be desirable in the long haul. One real encounter, even for a few seconds, is far more useful than several hundred observations.

Memory is a living structure, a scaffold of nearly infinite size. The more we generate impulses, encountering and overcoming difficulties, the more scaffolding we build, the faster we learn.

When you are practicing deeply, the world's usual rules are suspended. You use time efficiently. Your small efforts produce big, lasting results. You have positioned yourself at a place of leverage where you can capture failure and turn it into skill. The trick is to choose a goal just beyond your present abilities; to target the struggle. Thrashing blindly doesn't help. Reaching does.

It's all about finding the sweet spot. There's an optimal gap between what you know and what you're trying to do. When you find that sweet spot, learning takes off.

The second reason deep practice is a strange concept is that it makes events that we normally strive to avoid-namely mistakes-and turns them into skills. To understand how deep practice works, then, it's first useful to consider the unexpected but crucial importance of errors to the learning process.

No time plus no space equals better skills. Futsal is our national laboratory of improvisation. Futsal compresses soccer's essential skills into a small box; it places players inside the deep practice zone, making and correcting errors, constantly generating solutions to vivid problems. Players touching the

ball 600 percent more often learn faster, without realizing it, than they would in the vast expanse of the outdoor game. Futsal is the lever through which those other factors transfer their force.

Chapter 2-The Deep Practice Cell

I have always maintained that excepting fools, men did not differ much in intellect, only in zeal and hard work.-----Charles Darwin

On some fibers, myelin insulation grows fifty layers deep.

The revolution is built on three simple facts. 1. Every human movement, thought, or feeling is a precisely timed electric signal traveling through a chain of neurons-a circuit of nerve fibers. 2. Myelin is the insulation that wraps these nerve fibers and increases signal strength, speed, and accuracy. 3. The more we fire a particular circuit, the more myelin optimizes that circuit, and the stronger, faster, and more fluent our movements and thoughts become.

South Korean woman golfers have more myelin in the right parts of the brain and for the right muscle groups, and that's what allows them to optimize their circuitry. The same for Tiger Woods.

Skill is myelin insulation that wraps neural circuits and that grows according to certain signals. When you experience deep practice you are firing and optimizing a neural circuit-and growing myelin.

Question: Why is targeted, mistake-focused practice so effective? Answer: Because the best way to build a good circuit is to fire it, attend to mistakes, then fire it again, over and over. Struggle is not an option, it's a biological requirement.

Question: Why are passion and persistence key ingredients of talent? Answer: Because wrapping myelin around a big circuit requires immense time and energy. If you don't love it, you'll never work hard enough to be great.

While the physical demands were unique, there's no question that Armstrong's mental approach-the maniacal focus on errors, the desire to optimize every dimension of the race, the restless eagerness to operate at the edges of his and everyone else's abilities, added up to a one man clinic on the power of deep practice.

The more we develop a skill circuit, the less we're aware that we're aware that we're using it. We're built to make skills automatic, to stash them in our unconscious mind. This process, which is called automaticity, exists for powerful evolutionary reasons. The more processing we can do in our unconscious minds, the better our chances of noticing something dangerous. It also creates a powerfully convincing illusion: a skill, once gained feels utterly natural, as if it's something we've always possessed.

The more the nerve fires, the more myelin wraps around it. The more myelin wraps around it, the faster the signal travels, increasing velocities up to 100 times over signals sent through uninsulated fiber.

Myelin is an infrastructure all right, but with a powerful twist; within the vast metropolis of the brain, myelin quietly transforms narrow alleys into broad, lightning-fast super highways. The refractory time (the wait required between one signal and the next) decreases by a factor of 30. The increased speed and decreased refractory time combine to boost overall information-processing capability by 3,000 times-broadband indeed.

But the myelin model shows that certain hotbeds succeed not only because people there are trying harder but also because they are trying harder the right way-practicing more deeply and earning more skill.

Memory is not like shoe size, it could be improved through training. If short term memory wasn't limited, then what was? Every skill was a form of memory. Why wouldn't they all be subject to the same sort of training effect?

Ericsson studied the talent process from a different angle, he specifically measured the time and characteristics of practice. He found every expert in every field is the result of around ten thousand hours of committed practice. Ericsson called this process "deliberate practice" and defined it as working on technique, seeking constant critical feedback, and focusing ruthlessly on shoring up weaknesses. For practical purposes, we can consider "deliberate practice" and "deep practice" to be basically the same thing-though since he's a psychologist, Ericsson's term refers to the mental state, not to myelin.

The Ten Year Rule: States that world-class expertise in every domain (violin, math, chess, and so on) requires roughly a decade of committed practice. Even the astonishing chess prodigy Bobby Fischer put in nine hard years before achieving his grandmaster status at age seventeen.

It's estimated that Mozart had studied 3,500 hours of music by his sixth birthday, a fact that places his musical memory in the realm of impressive but obtainable skill.

Deep practice X 10,000 hours = world class skill. Except it isn't as simple as this equation.

Chapter 3 The Brontes, the Z-Boys, and the Renaissance

Excellence is a habit-----Aristotle

The Brontes became great writers not in spite of the fact that they started out immature and imitative but because they were willing to spend vast amounts of time and energy being immature and imitative, building myelin in the confined, safe space of their little books.

Skill is insulation that wraps around circuits and grows according to certain signals. Myelin doesn't care about who you are. It only cares about what you do.

"If people knew how hard I worked to gain my master," Michelangelo later said, "it would not seem so wonderful at all."

Genes construct our brains so that when we encounter certain stimuli-a tasty meal, rotting meat, a stalking tiger, or a potential mate-a factory loaded neural program kicks into gear, using emotions to

guide our behavior in a useful direction. We feel hunger when we smell a meal, disgust when we smell rotten meat, fear when we see a tiger, desire when we see a potential mate. Guided by these preset neural programs, we navigate toward a solution.

As we've seen, higher skills are made of million-neuron chains working together with exquisite millisecond timing. The question of acquiring higher skills is really a question of design strategy. What's the best strategy for writing instructions to build a machine that can learn immensely complicated skills?

Chapter 4---The Three Rules of Deep Practice

Try Again. Fail Again. Try Better---Samuel Beckett

How can people, who seem just like us, suddenly become talented while barely cognizant of how talented they've become? For the answer, we turn to a failed math teacher.

The master players didn't have photographic memories, when the game stopped resembling chess, their skills evaporated. The masters were not seeing individual chess pieces but recognizing patterns. When the pieces became random, the master were lost-not because they suddenly became dumber but because their grouping strategy was suddenly useless. It was a difference of organization, the difference between someone who understood a language and someone who didn't.

Skill consists of identifying important elements and grouping them into a meaningful framework. The name psychologists use for such organization is chunking.

When a gymnast learns a floor routine, he assembles it via a series of chunks, which in turn are made up of other chunks. He's grouped a series of muscle movements together in exactly the same way that grouped a series of letters together to form a word.

What separates top performers is not innate superpower but a slowly accrued act of construction and organization: the building of a scaffolding, bolt by bolt and circuit by circuit-or as Mr. Myelin might say, wrap by wrap.

Rule One: Chunk It Up

We heard it a billion times while we were growing up, from parents coaches who echoed the old refrain, "Just take one step at a time". But what I didn't understand until I visited the talent hot beds was just how effective that simple, intuitive strategy could be. In the talent hotbeds I visited, the chunking takes place in 3 dimensions. 1. First the participants look at the task as a whole-as one big chunk, the megacircuit. 2. They divide it into its smallest possible chunks. 3. They play with time, slowing the action down then speeding it up, to learn its inner architecture. People in hotbeds deep practice the same way a good movie director approaches a scene, one instant panning back to show the landscape, the next zooming in to examine a bug crawling on a leaf in slow motion. We will look at each technique to see how it is deployed.

Absorb the whole thing. This means spending time staring at or listening to the desired skill, the song, the move, the swing, whatever it is, as a single coherent entity. People in the hotbeds stare and listen in this way quite a lot. It sounds rather Zen, but basically amounts to absorbing a picture of the skill until you can imagine yourself doing it. We are prewired to imitate.

When I walked in, the reason became evident: they were swing all right. But they were not using tennis balls. At Spartak it's called *iniatsiya*-rallying in slow motion with an imaginary ball. *Preobrazhenskaya* enforced this approach with an iron decree; none of her students was permitted to play in a tournament for the first three years of their study. It's a notion that I don't imagine would fly with American parents, but none of the Russian parents questioned it for a second. "Technique is everything", she later told me, "If you begin playing without technique it's a huge mistake". Welcome to youth basketball in Wisconsin.

By a simple equation that has become the music school's de facto motto: in seven weeks, most students will learn a year's worth of material, an increase of about 500 percent in learning speed.

The goal is always the same: to break skill into its component pieces, memorize those pieces individually, then link them together in progressively larger groupings.

When camp director Owen Carman teaches a class, he spends three hours covering a single page of music. New students are surprised at the seemingly glacial pace-it's three or five times slower than they've ever gone. But when they are finished, they have learned to play the page perfectly; otherwise it would normally take two to three weeks of shallow practice.

Going slow allows you to attend more closely to errors, creating a higher degree of precision with each firing, and when it comes to growing myelin, precision is everything. It's not how fast you can do it, it's how slow you can do it correctly. Going slow helps the practicer to develop something even more important; a working perception of the skill's internal blueprints, the shape and rhythm of the interlocking skill circuits.

He's fascinated by the kind of learning that goes on when people observe, judge, and strategize their own performance, when they, in essence, coach themselves. Zimmerman's interest in this type of learning is known as self-regulation. He found that experts practice differently and far more strategically. When they fail, they don't blame it on luck or themselves. They have a strategy they can fix. Through practice, they had developed something more important than mere skill; they'd grown a detailed conceptual understanding that allowed them to control and adapt their performance, to fix problems.

Rule Two: Repeat It

Nothing you can do-talking, thinking, reading, imagining-is more effective in building skill than executing the action, firing the impulse down the nerve fiber, fixing errors, honing the circuit. What is the simplest way to diminish someone's skill-don't let them practice for a month. Their muscles will not have changed; their much vaunted genes and character will remain unaltered; but you will have touched their

talent at the weakest spot in its armor. Myelin, is living tissue. Live everything else in the body, it's in a constant cycle of breakdown and repair. that's why daily practice matters, particularly as we get older.

Repetition is invaluable and irreplaceable. There are however a few caveats. With conventional practice, more is always better; hitting two hundred forehands a day is presumed to be twice as good as hitting one hundred forehands a day. Deep practice, however, doesn't obey the same math. Spending more time is effective, but only if you're still in the sweep spot at the edge of your capabilities, attentively building and honing circuits. What's more there seems to be a universal limit for how much deep practice human beings can do in a day. Ericsson's research shows that most world class experts, including pianists, chess players, novelists, and athletes-practice between three and five hours a day, no matter what skill they pursue. People at most hotbeds I visited practiced less than three hours a day.

Force yourself to be as productive as possible while practicing.

When practicing you need to establish a balance point where you can sense the errors when they come. to avoid the mistakes, first you must feel them immediately. What you are really practicing is concentration. It's a feeling. So now we are going to practice that feeling.

Words used by participants at talent hotbeds that described the sensations of their most productive practice sessions: attention, connect, build, whole, alert, focus, mistake, repeat, tiring, edge, awake.

It evokes a feeling of reaching, failing short, and reaching again. Deep practice is not simply about struggling; it's about seeking out a particular struggle, which involves a cycle of distinct actions.

From the book, the Teaching Gap: "Sometimes the Japanese teacher will purposely give the wrong answer so the kids can grapple with the theory. American teachers, though, worked like waiters. Whenever there was a struggle, they wanted to move past it, make sure the class kept gliding along. But you don't learn by gliding.

Chapter 5-----Primal Cues

Every great and commanding moment in the annals of the work is a triumph of some enthusiasm.--
Ralph Waldo Emerson

Deep practice isn't a piece of cake: it requires energy, passion, and commitment. In a word, it requires motivational fuel, the second element of the talent code. When I visited the talent hotbeds I saw a lot of passion.

Question: Why do certain children progress quickly at music lessons and others don't? They asked the student's one question before their first lesson. The question was how long do you think you'll play your new instrument? The children were asked to identify how long they planned to play (the options were: through this year, through primary school, through high school, all my life), and their answers were condensed into three categories, short term, medium term, or long term commitment. He then measured practice time, low was 20 minutes a week, medium was 45 minutes a week, high was 90 minutes per week. He then plotted the results against their performance on a skill test.

What he saw stunned him. Progress was determined not by any measurable aptitude or trait, but by a tiny, powerful idea the child had even before starting lessons. The differences were staggering. With the same amount of practice, the long term commitment group outperformed the short term commitment group by 400 percent. The long term commitment group, with a mere twenty minutes of practice a week, progressed faster than the short terms who practiced for 90 minutes a week. When long term commitment was combined with high levels of practice the skill level skyrocketed.

We instinctively think of each new student as a blank slate, but the ideas they bring to that first lesson are probably far more important than anything a teacher can do, or any amount of practice. It's all about their perception of self. At some point very early on they had a crystallizing experience that brings the idea to the fore, that says, I am a musician. That idea is like a snowball rolling downhill.

When he played that, at that moment, something happened. Clarissa was awestruck by the jazz version. Entranced. She saw the teacher play it, and he must have played with some style, because she got an image of herself as a performer. The teacher didn't realize it then, but everything came together, and all of a sudden while hardly knowing it, she's on fire, desperate to learn.

What ignited the progress wasn't any innate skill or gene. It was a small, ephemeral, yet powerful idea: a vision of their ideal future selves, a vision that oriented, energized, and accelerated progress, and that originated in the outside world.

That signal sparked an intense, nearly unconscious response that manifested itself as an idea. "I want to be like them." It wasn't necessarily a logical idea for them to have. Recall that it didn't correlate with any aural, rhythmic, or mathematic skills they possessed.

Officially this area of study is called automaticity, but for our purposes Cohen and his colleagues are like the garage mechanics of ignition, tracing the invisible connections between our motivations and the environmental signals that quietly activate them.

Our brains are always looking for a cue as to where to spend energy now. Now? Now? We're swimming in an ocean of cues, constantly responding to them, but like fish in water, we just don't see it.

If we are in a nice, easy, pleasant environment, we naturally shut off effort. Why work? But if people get the signal that it's rough, they get motivated now. A nice, well kept tennis academy gives them the luxury future right now, of course they'd be demotivated. They can't help it.

The Scrooge Principal: Our unconscious mind is a stingy banker of energy reserves, keeping it's wealth in a vault.

In an experiment concerning motivation a group of students was given a group of magazine articles to read. One story was about Nathan Jackson who liked math and did well. The article was totally forgettable except for one detail, Nathan Jackson's birth date was altered to exactly match the students' own birthday who was reading the article. After the students read the articles their attitude and persistence towards math was measured. How long were they willing to work on an insoluble math problem? When the results came in they found that the birthday matched group had significantly more

positive attitudes about math and persisted a whopping 65 percent longer on the insoluble problem. What's more those students did not feel any conscious change. The coincidence of the birthday to use the researcher's term, had "gotten underneath them". The love and interest in math became part of them. They had no idea why. Suddenly it was us doing this, not just me.

Our suspicion is that these events are powerful because they are small and indirect. The model for ignition is a hair trigger connected to a high voltage power plant. Accordingly, ignition is determined by simple if/then propositions, with the then part always the same-better get busy. See someone you want to become? Better get busy. Want to catch up with a desirable group? Better get busy.

The unconscious mind can process 11 million pieces of information per second, while the conscious mind can manage a mere 40. This disproportion points to the efficiency and necessity of relegating mental activities to the unconscious-and helps us to understand why appeal to the unconscious can be so effective.

Why do breakthrough performances sometimes ignite talent blooms, and sometimes not?

Michelangelo was exposed to the greatest works of art, sculpture, painting, etc. everyday as he walked down the street-the message was simple, "better get busy".

Left to our own devices, we go along in a pretty stable mindset, but when we get a clear cue, a message that sends a spark, then we respond.

When we praise kids for their intelligence we tell them that's the name of the game: look smart, don't risk making mistakes. In experiments when you compare kids that are praised for their effort or hard work are compared to those who are praised for their intelligence, the effort group digs in and grows very involved in their effort to solve problems. They say that they like it. The group praised for their intelligence hated the harder tests because they were afraid the test was proof that they were not smart.

When retested the praised for effort group improved their initial score by 30 percent, the praised for intelligence group declined by 20 percent.

We are exquisitely attuned to messages telling us what is valued. We go around all of the time trying to understand or figure out who we are in a certain setting. So when a clear message comes it can send a spark.

Talent hotbeds used language that affirmed the value of effort and slow progress rather than innate talent or intelligence.

At all the places I visited, praise was not constant but was given only when earned-a finding that dovetails with the research of Dweck, who notes that motivation does not increase with increased levels of praise but often dips. Remember, our study showed the effect that just six words can have. It's all about clarity.

When we use the term motivational language, we are generally referring to language that speaks of hopes, dreams, and affirmations such as, "you are the best!". This kind of language is called high motivation-has it's role. But the message from the talent hotbeds is clear; high motivation is not the kind of language that ignites people. What works is precisely the opposite: not reaching up but reaching down, speaking to the ground level effort, affirming the struggle. Statements like, you are working hard, are much more effective than empty praise.

The truth is skill circuits are not easy to build; deep practice requires serious effort and passionate work. The truth is, when you are starting out, you don't play tennis; you struggle and fight and pay attention and slowly get better. The truth is, we learn in staggering baby steps. Effort based language work because it speak directly to the core of the learning experience, and when it comes to ignition, there's nothing more powerful.

Chapter 7---How to Ignite a Hotbed

Education is not the filling of a pail, but the lighting of a fire.-----W.B. Yeats

At a KIPP school the first day is like opening night at a Broadway play. There are scripts, timed entrances, and plotlines, a nervous audience, and then minutes before curtain, a backstage preshow huddle.

The fifth graders are the Class of 2015, the sixth are 2014; the number refers to the year in which they'll enter college.

This is KIPP culture. It covers how to walk, how to talk, (they work on the 3 inch voice, the twelve inch voice, and the room voice), how to sit at a desk (forward, upright, no pencil in hand), how to look at a teacher or classmate who's speaking (called tracking; head up, eyes on them, shoulders toward the speaker), and even how to negotiate the bathroom (use four or five sheets of toilet paper, on squirt of soap to wash hands). KIPP teachers plant trash around the school and see who picks it up, then celebrates that person in front of the group. Every single detail matters, everything they do is connected to everything else around them.

There are no desks because, the students are informed, they haven't earned them yet. The students open their binders to find several pages of math problems. This is silent work time, a morning staple at KIPP.

I'm going to be straight with you. There are a lot of people who think you can't do it. Because your family doesn't have money. Because you are Latino or Vietnamese. But here at KIPP we believe in you. If you work hard and are nice, you will go to college and have a successful life. You will be extraordinary because here we work really, really hard, and that makes you smart. You will make mistakes. You will mess up. We will too. But you will have beautiful behavior. Because everything here at KIPP is earned. Everything is earned.

If we had to classify the primal cues the KIPP students received in those first few minutes, they would fall into 3 categories. 1. You belong to a group. 2. Your group is together in a strange and dangerous new world. 3. That new world is shaped like a mountain, with the paradise of college at top.

Everything is everything. This sounds like new age palaver, but what he's really talking about is KIPP's insistence on environmental coherency; the way every element of this world, from the painted stripes on the floor to the eyes of the teacher, to the angle with which students carry their binders, sends clear, constant signals of belonging and identity: you are at KIPP, you are a Kippster! Students address each other as teammates. KIPP teachers refer to this process only half-jokingly as "KIPP-nosis". Kids who don't attend call KIPP, the Kids In Prison Program.

But I came to see that attention to detail is a big part of what makes someone academically successful.

KIPP teachers are not alone in their belief in this tactic. In 2005 Martin Seligman and Angela Duckworth studied several parameters of 164 eighth graders, including IQ, along with five tests that measured self-discipline. It turned out that self discipline was twice as accurate as IQ in predicting the student's GPA.

The culture is an incredibly strong force, and the only way to reach them is to change the way they see themselves.

One of the ways KIPP creates that change is through a technique it calls stopping the school. This is not fanciful language. When someone violates a significant rule, classes screech to a halt, and teachers and students hold a meeting to discuss what just happened and how to fix it.

KIPP teachers are skilled at slipping references to college into conversation, always with the presumption that all the students are destined for those golden shores.

We say college as often as people in other schools say um. Even the lettering above the classroom mirrors inquiries, "Where will you go to college?"

KIPP students start visiting colleges as soon as they're enrolled. KIPP Heartwood's fifth graders go to California schools like USC, Stanford, and UCLA, while seventh graders fly to the East Coast to walk the campuses of Yale, Columbia, and Brown, among others. While there, they meet with KIPP alumni who tell of their own journeys. Right now college is just a vague idea to the fifth graders. But by the end of fifth grade, after making a visit, we overhear them talking about it among themselves, saying things like "Yeah, I like Berkeley, but I think I'm more interested in Cal Poly".

When they get to KIPP, their lives are like a single dot on a map. You can't do anything with a dot. But when they connect the dot to another dot, to a college somewhere, then you get a connection. When they get back from those trips, they carry themselves differently.

You want to know the difference between having the knowledge and power to get the things you want and not having that knowledge? Fasten your seat belts, because that's where you are going, starting right now.

KIPP students are constantly reminded that their brains are muscles; the more they work them, the smarter they will get-and there is plenty of work to do. It's like it's the fourth quarter, we are down by a touchdown and we've got to score now.

What's striking in the end, however, is not how hard KIPP students work, but rather how swiftly and completely they take on the KIPP identity that provides the fuel for that hard work.

There's no special treatment for anybody. At my old school they let me slide, I could do five out of ten things and nobody cared. Here I do ten out of ten.

Chapter 8----The Talent Whisperers

It's not about talent, whatever the hell that is. I've never tried to go out and find someone who's talented. First you work on fundamentals, and pretty soon you find out where things are going.-- Robert Lansdrop, the tennis coach for Pete Sampras, Tracy Austin, and Lindsay Davenport

The coaches listened far more than they talked. They seemed allergic to giving pep talks or inspiring speeches; they spent most of their time offering small, targeted, highly specific adjustments. They had an extraordinary sensitivity to the person they were teaching, customizing each message to each student's personality.

Specifically his skill at sensing the student's needs and instantly producing the right signal to meet those needs.

Their personality-their core skill circuit-is to be more like farmers: careful, deliberate cultivators of myelin.

Wooden's "teaching utterances or comments were short, punctuated, and numerous. There were no lectures, no extended harangues, he rarely spoke longer than 20 seconds.

They recorded and coded 2,326 discrete acts of teaching. Of them, a mere 6.9% of them were compliments. Only 6.6% were expressions of displeasure. But 75% were pure information: what to do, how to do it, when to intensify an activity. One of Wooden's most frequent forms of teaching was a three part instruction where he modeled the right way to do something, showed the incorrect way, and then remodeled the right way, a sequence that appeared in their research as M+, M+, M+; it happened so often they named it a "Wooden". Wooden's demonstrations rarely take longer than 3 seconds but are of such clarity that they leave an image in memory much like a textbook sketch. The information didn't slow down the practice; to the contrary, Wooden combined it with something he called "mental and emotional conditioning", which basically amounted to everyone running harder than they did games, all of the time. As former player Bill Walton said, "Practices at UCLA were nonstop, electric, supercharged, intense, and demanding. While Wooden's practices looked natural and unplanned, in fact they were anything but. His planning included specific goals for the team and for individuals.

The deeper you practice, the better you get.

Once Miss Mary asked my father if he ever played an instrument. He said he had tried piano but didn't have the knack. "Didn't have the patience, you mean," Miss Mary replied kindly but firmly.

They succeed because they are tapping into the second element of the talent code: They are creating and sustaining motivation; they are teaching love. As Bloom's study summed up, "The effect of this first phase of learning seemed to be to get the learner involved, captivated, hooked, and to get the learner to need and want more information and expertise."

These teachers gave much positive reinforcement and only rarely were critical of the child. However, they did set standards and expected the child to make progress, although this was largely done with approval and praise.

Master coaching is something more evanescent: more art than science. It exists in the space between two people, in the warm, messy game of language, gesture, and expression.

Chapter 9----The Teaching Circuit: A Blueprint

A teacher effects eternity; he can never tell where his influence stops.----Henry Brook Adams

The key words in coaching are knowledge, recognize, and connect.

A coach's true skill consists not in some universally applicable wisdom that he can communicate to all, but rather in the supple ability to locate the sweep spot on the edge of each individual student's ability, and to send the right signals to help the student reach toward the right goal, over and over.

Matrix is the word for the vast grid of task specific knowledge that distinguishes the best teachers and allows them to creatively and effectively respond to a student's efforts.

This isn't about math. I'm not teaching math. It's about life. It's about every single day being a new day, and each time you wake up, you look at the sky you've got as a gift. The day is here. What are you going to do with it?

Chapter 10----Tom Marinez and the 60 Million Bet

A teacher is someone who makes himself progressively unnecessary.----Thomas Crutgers

Toyota implements around a thousand tiny fixes in each of its assembly lines, about a million tiny fixes overall. Toyota, moving in these fitful baby steps.

When something goes wrong ask, ask WHY five times.

Please talk to us about your problems so we can all work on them together.--attitude at Toyota

The key is that people have to linger in that uncomfortable area, learn to tolerate the anxiety. If you practice, you can get to the level you want.

Neurosis is just high class whining. The trouble with most therapy is that it helps you to feel better. But you don't get better. You have to back it up with action, action, action. Ellis's approach, combined with Beck's became known as cognitive-behavioral therapy, which has been shown to be equal to or better prescription drugs for stopping depression, OCD, and anxiety.

Epictetus, who said, "It's not events but our opinions of them, which cause suffering."

The point Shiloff explained, is to fire the circuit and thus to linger in the discomfort a little longer each time.

Myelin literally starts to split apart with age. This is why every old person you've ever met in your life moves more slowly than they did when they were younger. Their muscles haven't changed, but the speed of the impulses they can send to them has changed, because the myelin gets old.

I feel it in a changed attitude toward failure, which doesn't feel like a setback or the writing on the wall anymore, but like a path forward.

Dweck, the psychologist who studies motivation, likes to say that all the world's parenting advice can be distilled to two simple rules: pay attention to what your children are fascinated by, and praise them for their effort.