

Imagine – How Creativity Works by Jonah Lehrer – 2012

Introduction

- How Procter & Gamble came up with the Swifter
 - ♦ Think crazy – out of the box
 - Watch existing process from start to finish
 - Breakthrough idea
 - Test and refine almost endlessly
- Book is about these creative moments happen
 - First we study the brain
- Creativity defined
 - A catchall term for a variety of distinct thought processes
 - 2. Anthropologist phase: careful and tedious observation
 - Clear the mind of old ideas and preconceptions
 - Better understand the problem
 - 3. Moment of insight
 - 4. Fine tune and perfect the solution
 - The process involves both hard, tedious work and inspiration
 - Both areas are enhanced when other people are added to the individual

Alone

Ch 1 – Bob Dylan's Brain

- The impasse: He was exhausted with music and gave up his life
- The revelation: He suddenly 'vomited' up a mass of writing that he was certain was what he wanted to say
- The result: He worked to assemble his idea and immediately recorded it at a record studio. It changed the music world forever – Like a Rolling Stone
- Brain studies
 - The left hemisphere deals with denotation – literal meanings of words – and drives logic
 - The right hemisphere deals with connotation – meanings which are associative and not logical – metaphor, insight puzzles, hidden connections
 - When the literal associations (left brain) fail people get frustrated and give up. This is when the right brain is able to take over and insight occurs. Both conditions are required.

Ch 2 – Alpha Waves (Condition Blue)

Creativity is the residue of time wasted – Albert Einstein

- Minnesota Mining and Manufacturing Company (3M) is a company built on the concept that creativity can be nurtured.
 - Flexible attention policy – instead of constant concentration, when a problem seems unsolvable, take time off to relax your mind.
 - A relaxed state of mind allows alpha waves to appear, indicating the right side of the brain is active. All insights are preceded by a steady rhythm of alpha waves.
 - This is the origin of the fact that a positive mood is more conducive to intuitive thought.
 - The left brain reduces activity just before an insight is gained, i.e. people often cover their eyes to when they are about to get an insight.
 - 3M also has the 15% rule. 15% of a researcher's day is to be spent pursuing speculative new ideas.
 - Stimulants normally allow people to concentrate for longer periods of time. However, this stimulates the left brain – concentration – and makes access to the right brain more difficult. You get a lot done, but you get very few new thoughts.
 - Sharing information with diverse associates on a regular, formal basis is also required to allow different disciplines to hear and react to information (horizontal interactions).

- The act of investigation is really an act of recombination of two things that had not been formally connected (conceptual blending).
 - A key element in successful conceptual blending is a willingness to consider information and ideas that don't seem worth considering.
 - The inability to focus helps ensure a richer mixture of thoughts in consciousness. Creative individuals seem to remain in contact with the extra information constantly streaming in from the environment.
- When people are 'daydreaming' it is assumed their brain is resting, but when there is a lack of external stimuli, the brain starts to explore its inner database and is often more active than when it is reacting to outside stimuli.
 - It is in this state that the brain is able to blend together concepts that are normally filed away in different areas, i.e. a very weak adhesive and a need to store temporary bookmarks in a book (Post-It Notes).
 - Daydreaming comes in two forms...
 6. If people only notice they are daydreaming when someone else prods them, their daydreaming does not increase their ability to be creative
 7. If people catch themselves during their daydreaming, then they are indulging in daydreaming that exhibits increased creativity
- It appears the color red encourages skills that require accuracy and attention to detail – people are more alert and aware
- The color blue reduces production on short-term memory tasks, but increases performance on tasks requiring imagination and creative output.
- Creativity isn't a fixed fixture of the mind that some have and some do not, but it is an approach that everyone can increase and use.

Ch 3 – The Unconcealing

- Creativity is more than just inspiration; it is also a great deal of perspiration. This extended concentration is necessary to bring an inspiration to fruition, i.e. a poet must work to pare down his work until the words are lean and expressive.
 - Why does Benzedrine make someone more likely to persevere? Amphetamines increase the amount of dopamine in the synapse and making the chemical linger longer. This allows concentration to seem more pleasurable.
 - Amphetamines do more than focus the attention; they make it easier to connect ideas by keeping them in the *working memory* part of the brain.
 - This then, is the ability to take an insight and pare it to its simplest elements, but it does not help get the insight in the first place.
- The power of attention and working memory is that it allows us to relentlessly refine our ideas, to continue thinking about our thoughts. Design is the conscious imposition of meaningful order.
- The reality of things is naturally obscured by the clutter of the world, by all those ideas and sensations that distract the mind, and the only way to see through this clutter is to rely on the knife of conscious attention, which can cut away the excess and reveal “the things themselves. This mental process is called unconcealing.
- Working memory is an essential tool of the imagination – not easy or pleasant to persist with, but necessary to the creative process.
- Moods and creativity
 - A little melancholy sharpens the spotlight of attention, allowing us to become more observant and persistent, even though it also makes us less likely to have moments of insight.
 - It is not easy to write a good novel or compose a piece of music, as the process can require years of careful attention. This persistence is often accompanied by mood disorders.
 - Since creativity is often inspiration, followed by persistent attention to detail, it is not surprising to find that successful creative people are 20 times more likely to suffer from bipolar disorder.
 - Perhaps this is the reason why the illness has been preserved throughout human evolution

Ch 4 – The Letting Go

The struggle of maturity is to recover the seriousness of a child at play. – Friedrich Nietzsche

- Yo-Yo Ma: “Perfection is not very communicative. If you are only worried about not making a mistake, then you will communicate nothing. You will have missed the point of making music, which is to make people feel something. It's when I'm least conscious of what I'm doing, when I'm just lost in the emotion of the music, that I'm performing at my best.”
 - There is something scary about letting ourselves go. It means that we will screw up, that we will relinquish the possibility of perfection. It means we will not have complete control. It is also an extremely valuable source of creativity.
- Jazz musicians, when they are riffing, turn off a part of the brain that is most closely associated with impulse control. This is the bit of neural matter that keeps us from making embarrassing confessions, or grabbing at food, or stealing from a store. It's a neural restraint system that the mind uses on itself.
 - This improv process is not reckless or random, but constrained by the particular rules of the form.
 - This process is not involved with individual notes, but already known patterns. For this reason this process is only available to people who have spent a great deal of time playing and practicing.

- The Second City theater school of improv
 - One of the fundamental skills taught is the ability to not care what others think
 - The best improv artists are good at turning off their 'filters'
 - When performing together, improvisers can never question what came before - "yes, and ..." - and have to continue from where they are at that point.
- The prefrontal cortex shuts down when we fall asleep each night and we all temporarily turn into improv artists.
- When we know what we are about, but can let go and play like a child, we will be more able to access our creative capabilities.

Ch 5 – The Outsider

- The passionate amateur is an outsider to professionals and can often make associations that professionals would never think to make.
- InnoCentive is a website where companies post difficult scientific problems their inside experts have been unable to solve. They invite outsiders to submit solutions for a monetary reward, if the problem is successfully solved.
 - Started by Eli Lilly in 2001, it is now an independent website with hundreds of companies participating.
 - Problem solvers are most effective when the problem is at the margin of their fields, not when it is their specialty. This is because invariably the solutions and approaches take ideas from one area and apply them to different areas.
 - Insiders are too aware of the rules within their disciplines and it is only when the challenge is shared with motivated outsiders that the solution can be found.
- The ultimate outsiders are our youth – those with little experience to hem in their ideas.
 - We can continue to innovate for our entire careers as long as we work to maintain the perspective of the outsider.
- Creativity isn't a phase of life – it's a *state of mind*.
- Travel helps us to find ourselves in new surroundings and retain our mindset as that of an outsider.
 - Cultural contrasts mean that seasoned travelers are alive to ambiguity, more willing to realize that there are different ways of interpreting the world
 - People with multiple social identities (Asian and American) are also able to take advantage of the outsider syndrome
 - Proportionally, immigrants consistently submit more patents and evolve more creative solutions to problems than do native born Americans
- Changing our careers means we again become an outsider.
- The only way to remain creative over time is to experiment with ignorance and concentrate on things we don't fully understand.

Together

Ch 6 – The Power Of Q

Not everyone can become a great artist, but a great artist can come from anywhere. - Anton Ego, in Pixar's Ratatouille

- The source of every new idea is the same. There is a network of neurons in the brain, and then the network shifts.
- Sometimes a single network isn't enough. Sometimes a creative problem is so difficult that it requires people to connect their imaginations together; the answer arrives only if we collaborate.
- But how should we work together? What's the ideal strategy for group creativity?
 - Nobody creates a Broadway musical by themselves; the production requires too many different kinds of talent.
 - People who worked on Broadway are part of an extremely interconnected social network.
 - The most successful plays were those developed by a team that had a balance of experience working together and new members (outsiders) who hadn't previously worked with the group – or possibly even on Broadway.
 - A scientific measure of the density of these relationships (Q) revealed that if the level was too high – too much inbreeding – or too low – not enough experience – the play was much more likely to be a failure.
- The story of Pixar
 - Pixar was a unique studio in that the computer programmers were mixed together with the production staff – Disney tried to separate the functions, because that's the way all other studios operated.
 - Pixar resisted this pressure because they didn't want to place any constraints on the interactions of its employees. Creativity emerged from its culture of horizontal collaboration.
 - Steve Jobs designed the new studio facilities for the successful company
 - Mailboxes were placed in the central lobby
 - Meeting rooms were in the center of the building
 - The only bathrooms were placed in the central atrium
 - The idea was to force people together and encourage miscellaneous, serendipitous conversation
 - The atmosphere was designed to resemble a campus, where everyone interacted and ideas flowed across all the disciplines.
 - The company created "third places" to interact
 - ◆ Home: first place
 - ◆ Work: second place

- Each day begins with a crit session, where work is discussed and criticized. All disciplines are represented and everyone is tasked with finding errors or omissions. In this way the product was made better and all disciplines learned from others' mistakes.
- Brainstorming – where criticism is prohibited – is not an effective method for encouraging creativity. The only way to maximize group creativity – to make the whole more than the sum of its parts – is to encourage a candid discussion of mistakes.
 - Debate and criticism do not inhibit ideas but stimulate them relative to every other condition.
 - The power of dissent is really about the power to surprise. The simple fact of dissent stimulates the brain to be more creative in associating ideas.
- It has been found that the highest performing employees – those with the most useful new ideas – were the ones who consistently engaged in the most interactions with other employees. The most important room in every office is the coffee room.
- Innovative systems constantly veer toward the “edge of chaos” - those environments that are neither fully predictable nor fully anarchic.
- Ideas can come from varied and totally unrelated sources. This is the basis for informal group discussion and allowing people time to break away from intense focus on a problem.

Ch 7 – Urban Friction

By its nature, the metropolis provides what otherwise could only be given by traveling; namely, the strange. Jane Jacob

- The metropolis is like a sonic blender; every street is a mix tape. Cities expand the imagination by exposing us to unexpected things. And then, when we are in our studios, we can't help but weave these ideas into our own work.
- The end result of a crowded city is a constant churn of ideas as strangers learn from one another – knowledge spillovers. The sheer disorder of the metropolis maximizes the amount of spillover.
- Urban patterns common across all cities (superlinear scaling) – Geoffrey West
 - Every socioeconomic variable that can be measured in cities – from the production of patents to per capita income – scales to an exponent of approximately 1.15.
 - The correlations remain the same even when the numbers are adjusted for levels of education, work experience, and IQ scores.
- What doesn't this equation explain?
 - The pace of life closely tracks the population of cities, so the greater concentration of people, the faster they walk
 - There seems to be a correlation between walking speed and the production of patents.
 - In recent decades urban planning has focused on reducing interactions – the suburbs – and we see a proportional decline in productivity. Increase density and productivity goes up.
- People have between four and seven close friends (strong ties); however, the number of weak ties varies dramatically from person to person.
 - Businesspeople with large numbers of weak ties were three times more innovative than people with small networks of close friends.
 - Sometimes the most important people in life are the people we barely know. They are also more likely to less like ourselves and thus expose us to different ways of thinking or interacting.
 - Our most important new ideas don't arrive on a screen; rather, they emerge from idle conversation, from too many scientists sharing the same space.
 - The internet can maximize our efficiency and ease our ability to find information, but it doesn't increase the serendipity of ideas.
- The urban dance cannot be choreographed in advance or controlled from above. The creativity is inseparable from its freedom, from the natural chaos of a densely populated Zip Code.
- Why are cities eternal and corporations die?
 - Productivity in cities increases with density, but corporations decline in productivity as they grow larger.
 - They erect walls and establish hierarchies
 - They stifle conversations, discourage dissent, and suffocate social networks
 - Rather than maximizing employee creativity, they become obsessed with minor efficiencies
 - Corporations are managed in a top-down fashion by a team of highly paid executives, while cities are unruly places, largely immune to the desires of politicians and planners.
 - Cities' crowded spaces force us to interact and that keeps the city alive

Ch 8 – The Shakespeare Paradox

No man is an island. – John Donne

- Human geniuses aren't scattered randomly across time and space; instead, they tend to arrive in tight local clusters
 - Athens: 440 B.C. To 380 B.C.
 - Florence: 1450 to 1490
 - London: 1580 to 1642

- Elizabethan England proved to be the ideal place for a young dramatist to develop.
 - Shakespeare's London was one of the densest settlements in human history. Wages were about 50% higher than in other parts of the country. By 1590 more than 50% of the population was under the age of twenty. The literacy rate approached 50%, while in Catholic France more than 75% of the population couldn't sign their names.
 - It was an age obsessed with the theater and a reminder that culture largely determines creative output.
 - Marlowe, Ben Jonson, John Milton, Sir Walter Raleigh, John Fletcher, Edmund Spenser, Thomas Kyd, Philip Sidney, Thomas Nash, John Donne, Francis Bacon were all part of this culture
 - The era officially ended when the Puritans took control in 1642
- Culture usually holds innovation back, but every once in a while, we get it right and, for awhile, geniuses flower.
- Paul Romer's theory of economic growth points out that ideas are an inexhaustible resource – a nonrival good. When knowledge spreads from person to person, that knowledge isn't diminished or worn out.
 - There is a big difference between objects and ideas.
 - Increased sharing is almost always a good thing, because when ideas are shared, the possibilities do not add up, they multiply.
- The key is how to create a multiplier culture.
 - It may be great to concentrate people and give them the freedom to exchange information, but you still need the right set of rules and customs (meta-ideas) in place to make sure all those people can take advantage of their interactions.
 - Meta-ideas in Elizabethan England
 - Relaxation of censorship law enforcement for playwrights
 - Intellectual property – rules were developed for new inventions, but there were few copyright rules, allowing playwrights to steal stories and lines from each other, until these rules evolved – near the end of the age of geniuses.
 - Spread of education – there was a concerted effort to educate young males of the middle class
 - T.S. Eliot - "The great ages did not perhaps produce much more talent than ours, but less talent was wasted."
- Successful education systems in our time
 - New Orleans Center for Creative Arts (NOCCA)
 - Students are selected based on potential, not polish
 - The school uses a master-apprentice approach
 - The students spend their time creating, not with textbooks, exercises, or tests, but with projects
 - ◆ Teachers say they want creative students, but reject the traits most closely aligned with creative thinking
 - ◆ Typical schools are not designed for self-expression or persistent study
 - ◆ Kids are most focused when they are having fun, thus creative training should begin very early
 - Students spend five hours a day working on their own creations, they learn what it takes to get good at something and how to struggle, fail, and try again
 - The ability to stick with something – grit – is one of the most important predictors of success.
 - Kids are grouped by skill level, not by age or grade
 - Students constructively criticize one another's work
 - High Tech High, a San Diego charter school
 - Students are admitted using a random lottery system
 - Nearly a third of the students are first-generation college students.
 - Emphasizes learning by doing – each student is required to complete numerous projects that take up much of their school day (Dewey: Understanding derives from activity).
 - Every single High Tech High graduate has been admitted to college, and more than 85% have graduated from four-year institutions
 - The best schools ensure that unstructured play – what happens when a child creates and explores on their own – is an essential part of the classroom experience
- What are the meta-ideas we need to embrace?
 - We already know how to do this, because we do it with our children today – in athletics
 - The first meta-idea we need to take seriously is education – for all children
 - If we are not going to properly educate our own children, then we need to at least open the doors and encourage immigration.
 - Ages of excess genius are always accompanied by new forms of human mixing.
 - 1% rise in immigrants with college degrees will lead to a 15% rise in patent production
 - Another meta-idea is a willingness to take risks
 - Encourage those who take chances – most entrepreneurs will fail (even Shakespeare wrote a number of bad plays)
 - Manage the rewards of innovation
 - Inventors should profit from their past inventions, but we also need to encourage a culture of borrowing and adaptation.
 - Our patent laws originally were set at 14 years and, since 1962, have been revised upward 11 times and now are at 95 years.
- The virtue of studying ages of excess genius is that they give us a way to measure ourselves. We have to make it easy to become a genius.