LEARN, IMPROVE, MASTER

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HOW TO DEVELOP ANY SKILL AND EXCEL AT IT

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How to Develop Any Skill and Excel at It

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To those who have dedicated their lives to the pursuit of mastery,
and those who are about to.

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Introduction

> In the case of everything perfect we are accustomed to abstain from asking how it became: We rejoice in the present fact as though it came out of the ground by magic.
>
> —FRIEDRICH NIETZSCHE

A young mother holds the body of her dead child across her lap. She looks down at him in a moment of overwhelming love and sorrow, her grief forever captured in stone by one of the greatest artists that's ever lived, Michelangelo Buonarroti. The details of this sculptural masterpiece, the *Pietà*, make us forget we are looking at marble. What we see instead are figures of flesh and drapery so vivid they keep our gaze fixed, awaiting their movement. It is one of the most beautiful works of art ever created.

In response to people's admiration of his *Pietà*, Michelangelo is supposed to have said, "If people knew how hard I had to work to gain my mastery, it would not seem so wonderful at all." What seemed like the product of pure genius was the result of years of labor and many more learning his craft. We tend to think of mastery as something magical or the consequence of raw “talent,” but it comes from effort and dedication over many years—in most cases, a lifetime.

We usually see a master’s polished performance or the refined final product of their efforts, but not the process behind it, and so we believe that what they do is beyond our capabilities. We think we don’t have the talent or special abilities to do what they do. It’s like watching a magic illusion. A magician vanishes a card and makes it reappear in an impossible location. As spectators, we see the end result and are amazed by it. But we do not get a glimpse at the mechanics that made it possible. If we could peek behind the illusion, we would find a process anyone can replicate through the study and practice of sleight of hand.

The same is true when watching a great quarterback playing a championship game, a virtuoso cellist giving a concert, or an inspiring speaker commanding the stage. We look at their performance, not how they developed their skills through a process that we could follow too.

This book is about that process: how to learn, improve, and master any skill. We’ll look past the “smoke and mirrors” and study the method that creates the magic. We’ll begin by exploring the principles of learning and common misconceptions (Foundation). Then, we’ll discuss how to learn anything (part I). After that, we’ll move into improving our abilities and overcoming common challenges (part II). And finally, we’ll get into mastery and the path to pursue it (part III).

While everything we’ll cover throughout the book stands on science, this is not a science book. I’ll keep the scientific explanations, research, and studies to a minimum and present them in their simplest form. We can think of it this way: racecar drivers don’t need to know all the mechanics or engineering of their cars; their focus is on mastering how to drive them. This will be our approach. We'll cover some science of how our mind works, but our main interest will be how to use it. For those interested in going deeper into the science, see the "Selected Bibliography" section at the end for referenced material.

I divided most chapters into principles and strategies, with each of these sections laid out one major point at a time. The principles are the essence behind the strategies, and once you understand them, you won't be limited to the strategies I give you—you'll be able to come up with your own. As pioneer efficiency engineer and management theorist Harrington Emerson noted, "As to methods there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble." That said, you'll still find many strategies and tactics to have immediate actionable steps.

Whether you are taking on a new skill or already working on one, these pages will serve as a companion guide to help you learn and master your craft. I'll share with you everything I've learned through years researching and studying cognitive science, top performance, and mastery. I'll show you how to optimize your process and give you the tools to make your dream of excelling at a sport, music, art, (or anything else) a reality.

Nick Velasquez
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FOUNDATION

CHAPTER 1

Principles of Learning

> Learning proceeds until death and only then does it stop...Its purpose cannot be given up for even a moment. To pursue it is to be human, to give it up to be a beast.
>
> —XUN KUANG

Learning is the greatest power of the human mind. Everything we've built, everything we've created, everything we've become has been the result of our ability to learn. And this great power is inherent in all of us. We are made to learn.

Throughout millennia of evolution, we developed two primary systems to adapt to our environment. One is our genes, a transgenerational long-term memory encoded in our DNA. Genes carry the instructions for our physiology (and some behavioral traits) and are an inflexible system that evolves over many generations. The other is our learning brain, a flexible system that learns from our environment and adapts to changing circumstances.

Our learning brain allows us to develop skills based on specific needs and wants within our lifetime. Consider reading and writing. Written language is too recent for humans to have evolved a brain structure designed for it. We can read and write because our brain can learn. And the same goes for playing a sport, a musical instrument, or a board game. Without a learning brain, we couldn't take on any of those skills, or the thousands that exist as hobbies and professions. But how does the brain learn? What's behind the greatest of our powers? Let's delve into the principles of learning.

Neuroplasticity and Specialization

The first principle we'll discuss is our brain's capacity to adapt, known in scientific terms as "neuroplasticity." Instead of being a fixed structure, our brain can change itself depending on circumstances and redirect functions to different regions to optimize the neural pathways we frequently use. The implication of neuroplasticity in learning skills is that our brain changes as we learn them. If we take on the cello, for instance, the area of our brain responsible for finger movement in our fingering hand will enlarge and become more active. With extensive practice, our brain will recruit more neurons for the task, strengthening connections and building complex networks that specialize in playing the instrument.

This principle is illustrated by the results of brain scans done on musicians. A study led by Thomas Elbert from the University of Konstanz in Germany showed that the brain area responsible for left-hand movement in violinists and other string instrument musicians, their fingering hand, was larger than in non-string instrument players.

At the same time, the results showed that the brain area responsible for right-hand movement in the same string instrument musicians, the bow hand, was similar to that of non-string instrument players. In other words, the brain area controlling the fingering hand of violinists, cellists, and bassists was overdeveloped, while the one responsible for the bow was average.

The results indicate that the string instrument musicians were not born with more complex brain structures for using their hands—had that been the case, they would have shown larger brain areas for both of them and not just one—but instead, that their brain had changed in response to the demands and use of their fingering hand, directing more energy and resources to the area responsible for its movement.

Our brain's capacity to change itself also applies to mental skills. Professor of Cognitive Neuroscience Eleanor Maguire and her colleagues examined the brain structure of London cab drivers and compared them to non-cab drivers of the same age group. Cab drivers in London must go through extensive training to navigate the city. They need to memorize streets, buildings, routes, and by the time they complete their training, they should know the fastest way from any point in the city to another. Their skill is impressive, and so is the way developing it changed their brain. Maguire and her team found that the cabbies' posterior hippocampi, responsible for spatial navigation skills, was much larger than in non-cab drivers.

Their study also revealed a direct correlation between the time spent working as a cab driver and the size of the brain area recruited for spatial navigation skills. The longer their career behind the wheel, the bigger the area used for the task. This brings us to a fundamental principle of learning and mastering skills. When we practice, our brain changes to specialize, and the more we practice, the more pronounced the effect. Let's take a closer look at how this specialization is built and strengthened.

Imagine you are on a hike, and you come across a field of high grass. There's no path ahead, so you have to make your way through this grass to cross to the other side. The next day, you go on the same hike and face the field again, but this time you see a trail of tamped-down grass made by the steps you took the day before. You follow the same route, and in doing so, you make it more accessible to walk next time. If you keep doing this for several days, that rough trail will turn into a smooth path.

Neural pathways work in a similar way. First, we create a primary neural connection for a behavior or thought process, the rough trail going from one neuron or group of neurons to another. But as we keep using the connections, they become faster and stronger, allowing information to move more efficiently from one side to the other.

Without getting too technical, this efficiency builds as a substance called myelin surrounds the neural connections we repeatedly use—a process called myelination. Myelin works as an insulator that supports stronger and faster signal exchange between neurons. The amount of myelin surrounding neural connections depends on the frequency of use. The more we use them, the more layers of myelin they get.

Myelination is the internal process for getting better at anything: through practice, we build layer upon layer of myelin on the neural pathways related to our skill, making them robust and specialized, the neural equivalent of turning a rough trail into a path. And if we continue our practice over the years, that path evolves into a speedway.

So far, we've discussed how learning promotes physical changes in our brain. Now let's see how learning changes the way we think.

Association

Learning is about making connections. Neurologically, these happen when neurons get excited simultaneously, making them bond to each other—a process first described by neuropsychologist Donald Hebb as "*neurons that fire together wire together.*" Cognitively, they happen when we associate ideas, concepts, patterns of thinking, and behavior.

Let's take speaking a language as an example. We started learning our native language by making associations between sounds and our environment. The sound "mom" (or "*mamá,*" or "*maman,*" in Spanish and French respectively) was just noise, but after training from our parents, we began to associate the noise with our mother. Over time, the connection got reinforced and turned both the word and its meaning into a single unit. "Mom" stopped being noise and became permanently linked to what it represents.

Throughout life, we make thousands of these associations between noises and concepts, developing fluency in our native language. These connections become so strong we can't separate them. If someone is talking to us in our native language, we can't help but interpret concepts and meaning instead of hearing noises.

Association plays a primary role in developing skills. When learning to play the piano, for instance, we create connections between finger movements and sounds we want to produce. In hockey, we associate how we hit the puck with where we want it to go. And the same applies for other sports, arts, or anything else. We build our abilities by creating connections and reinforcing them over time.

Chunking

When associations grow complex, they lead to chunking. This is when our brain groups and processes several pieces of information as a unit instead of individually. When reading, for instance, we look at letters but process them in groups as words. Two associations are at play here: one between each letter and its sound, and a larger one for what they mean and sound like when put together to form words. Taken one step further, we chunk words together and interpret them as sentences.

When learning to drive, making a turn seems like a long list of tasks that need to happen in close succession: use the flasher to signal the turn, reduce your speed, check your mirrors, verify the road is clear, rotate the steering wheel, adjust speed as you turn. At first, each step stands on its own—*one, two, three*—and we create separate connections between each step and how our body should move. But with practice, we chunk the steps together until turning becomes one fluid sequence. We no longer process all the steps of the turn individually but see them as part of a larger action.

The same principle applies to all other learning. We start by making individual associations between concepts and behavior and then group them to form more complex, larger chunks. As we get better at processing these associations, they move from our conscious awareness into our subconscious (we no longer read letters but see words instead, and we pay little attention to our body movements as we drive). Let's take a look.

Automatic Processing

When we reinforce connections between thinking patterns or behavior, they start becoming automatic. Consider walking, a skill we learned early in life. At the time, it was difficult for us, but we don't pay attention to it now. Walking became a seemingly automatic process. We no longer think of how or in what order to move our legs and balance our body.

With enough practice, we can automate tasks, or parts of them, and reduce the conscious awareness we give to their execution. This automation is valuable in learning because it frees up conscious energy to work on other things and build on top of what we already know.

Masters take this process to the extreme. They practice their craft to a point where they can execute outstanding technique without thinking much about it. Their conscious mind is not occupied with the mechanics of the task and can instead focus on higher-order thinking, such as expression, creativity, or strategy.

Consider the speed of professional violinists. They move four fingers from one hand through the fingerboard, landing on the right position at the right time, while the other hand moves the bow at the correct angle with the right speed to get the desired sounds. That's too complex for the conscious mind to process.

Professional violinists can play fast because they have reinforced the neural connections associated with the mental and physical tasks of playing the instrument to the point of automation. They no longer focus on where to put their fingers or what angle to move the bow to hit the right notes. With the subconscious handling those parts, the violinists' conscious energy can be directed to their interpretation and other areas of their performance.

An important note to keep in mind is that automatic processing (aka automaticity) does not discriminate between desired behaviors and undesired ones. If we repeat bad habits or keep making the same mistakes, that's what we'll reinforce and automate—and they will be harder to correct later on. We must be careful, then, of what we automate to avoid transferring the wrong things into our subconscious.

The principles we've covered—neuroplasticity, specialization, association, chunking, and automation—are the foundation of all learning. Our brain rewires itself through practice, creating clusters of neural connections composed of associations between thoughts, feelings, and behaviors that specialize in what we repeatedly do. When reinforced, these connections move from our conscious awareness to our subconscious, becoming almost automatic. Then, our conscious mind is free again to process new tasks and add complexity to our growing abilities. Whether we go into French cooking, sculpting, or golf, these are the processes taking place behind the scenes as we learn. And they change the way we think as much as they change the physical structures of our brain.

Let's move on now to dispel the popular myths and misconceptions surrounding learning and mastering skills.