

Introduction

Elements of Effective Thinking, Learning, and Creating

I know quite certainly that I myself have no special talent. Curiosity, obsession and dogged endurance, combined with self-criticism, have brought me to my ideas.

—Albert Einstein

A wondrously romantic belief is that brilliant students are born brilliant and brilliant thinkers magically produce brilliant ideas: *A+*, the star student aces the exam; *click*, Edison invents the lightbulb; *liftoff*, the Wright brothers soar into the sky; *abracadabra*, J. K. Rowling apparates Harry Potter; *yea*, the Founding Fathers resolve the Bill of Rights; *whoosh*, Ralph Lauren turns heads on fashion's runways; *eureka*, Einstein teases his hair and relativity falls out. We can all marvel at these fanciful visions of leaps of genius, but we should not be fooled into believing that they're reality. Brilliant students and brilliant innovators create their own victories by practicing habits of thinking that inevitably carry them step-by-step to works of greatness. No leaps are involved—a few basic strategies of

thought can lead to effective learning, understanding, and innovation. More importantly, *you* yourself can master and apply those strategies. This book presents practical, proven methods of effective thinking and creativity that lead to inevitable success in life.

We, the authors, are teachers. We have taught hundreds of thousands of students and adults how to think more effectively. Countless times we have encountered individuals with potential and watched the drama of life's transformation unfold—or not. Anne and Adam struggle with ideas, understand the basics, learn from mistakes, ask questions—and thrive. Fiona and Frank, with the same native talent, start at the same place, but they memorize without understanding, fear error, avoid uncertainty—and do not succeed. This book is about what makes the difference.

Education does not stop with the end of your formal schooling. Even if your formal school days are long past, you are still a student and, hopefully, will always be one. You can choose to learn habits of thought that will help you to meet the ongoing challenges of life—personal, professional, and societal.

Imagine Marie Curie, Albert Einstein, and William Shakespeare as students. Today we know them as famous geniuses, but when they were in school, they didn't walk around wearing a "FUTURE GENIUS" button. Instead, they just looked at the world differently by applying habits of mind that allowed them

to discover and create new and profound ideas. While we can celebrate famous geniuses and be inspired by their remarkable stories, this book is about *you*—a real person with strengths and weaknesses—not a mythologized hero. Look down at your shirt—if you don't see a "FUTURE GENIUS" button, then you too have the potential to innovate. Creativity is not a matter of magical inspiration. This book describes habits that will automatically cause *you* to regularly produce new knowledge and insight. Remember: Extraordinary people are just ordinary people who are thinking differently—and that could be you.

Ordinary students can attain extraordinary heights. Mark was one of our mathematics students whose work at the beginning of the semester was truly dismal. He was so lost that his homework assignments were neither right nor wrong—they were simply nonsense. He merely recycled math terms that he wrote down during class discussions without even knowing their meaning. It was as if he were writing a poem in a language that he himself did not understand. Although he was genuinely dedicated, Mark appeared to be the textbook example of a *lost cause*.

By the end of the semester, however, Mark had transformed himself into a different person—a person who was able to think about mathematics in clever and imaginative ways. As the term came to a close, he devised a creative and correct solution to a difficult,

long-standing challenge that no one else in the class was able to resolve. At some point during the semester, Mark had the epiphany that mathematics had meaning and that he could make sense of it. He returned to the most basic ideas of the subject—ideas that he had seen years before but never truly grasped. He floundered when he viewed learning as memorizing techniques and repeating words. He succeeded when he sought to understand fundamental ideas deeply. With his new mind-set, building up a solid understanding of the subject was relatively easy, and his success in the class was inevitable.

The principles of understanding the unknown and finding creative insights that transformed Mark's life can be taught, learned, and applied broadly across disciplines and professions. We have seen these methods of thinking transform otherwise ordinary people into innovative leaders, authors, artists, financial gurus, teachers, film producers, scientists, and, in a number of cases, multimillionaires.

Education is what survives when what has been learned has been forgotten.

—B. F. Skinner

Given that we, the authors, are professors, it is not surprising that many stories in this book take place in classroom settings. However, we have also taught tens

of thousands of lifelong learners. So when we offer illustrations from our school experiences, we hope that you will view them literally if you are in the classroom (as either a student or a teacher), or metaphorically if you now find yourself outside the ivy-covered walls of the academy. When Aesop wrote “The Tortoise and the Hare,” he was not aiming exclusively at the turtle market. Throughout life we frequently face challenges analogous to taking tests, earning grades, and understanding course material. Instead of taking formal tests, we encounter daunting questions from employers or even family and friends; instead of earning grades, we are judged in the workplace and in social settings; instead of understanding course material, we regularly need to master new skills and absorb new knowledge to keep up with a rapidly changing world. All our stories have direct relevance to you and your life.

Five elements of thinking and learning

The surprising fact is that just a few learnable strategies of thinking can make you more effective in the classroom, the boardroom, and the living room. You can personally *choose* to become more successful by adopting five learnable habits, which, in this book, we not only explain in detail but also make concrete and practical. Here in this section we briefly introduce those important habits to come.

Understand deeply:

Don't face complex issues head-on; first understand simple ideas deeply. Clear the clutter and expose what is really important. Be brutally honest about what you know and don't know. Then see what's missing, identify the gaps, and fill them in. Let go of bias, prejudice, and preconceived notions. There are degrees to understanding (it's not just a yes-or-no proposition) and you can always heighten yours. Rock-solid understanding is the foundation for success.

Make mistakes:

Fail to succeed. Intentionally get it wrong to inevitably get it even more right. Mistakes are great teachers—they highlight unforeseen opportunities and holes in your understanding. They also show you which way to turn next, and they ignite your imagination.

Raise questions:

Constantly create questions to clarify and extend your understanding. What's the real question? Working on the wrong questions can waste a lifetime. Ideas are in the air—the right questions will bring them out and help you see connections that otherwise would have been invisible.

Follow the flow of ideas:

Look back to see where ideas came from and then look ahead to discover where those ideas may lead. A

new idea is a beginning, not an end. Ideas are rare—milk them. Following the consequences of small ideas can result in big payoffs.

These four building blocks are basic elements for effective thinking, and we devised an easy way for you to remember them. You only need to recall the classical elements that were once believed to be the essential parts of all nature and matter. Those elements, which predated Socrates and influenced Renaissance culture and thought, are Earth, Fire, Air, and Water. So to help trigger your memory and enable you to apply these techniques, we associate each classical element with one of our strategies for effective thinking, learning, and creating:

 Earth ↔ Understand deeply

 Fire ↔ Make mistakes

 Air ↔ Raise questions

 Water ↔ Follow the flow of ideas

By mastering these strategies, you can and will *change*. The classical elements of nature included a fifth special element—the *quintessential element*—that was the changeless matter from which all the heavens were made. Ironically, here in our context of thinking and learning, the quintessential element is *change*.

 The Quintessential Element ↔ Change

Change:

The unchanging element is change—by mastering the first four elements, you can change the way you think and learn. You can always improve, grow, and extract more out of your education, yourself, and the way you live your life. Change is the universal constant that allows you to get the most out of living and learning.

In any movie, play, or literary work, media scholars tell us how to determine who truly is the main character of the story—it's the individual who, by the end, has changed the most. Your life is an exciting journey. When you embrace change, you put yourself front and center by intentionally deciding in which direction you wish your life's drama to unfold. In doing so, *you* become the hero in your own life's adventure.

The chapters ahead unpack the previous sound-bite sentences by more fully describing our five elements of effective thinking. Exercises, action items, illustrations, and stories in each chapter turn these elements into a practical way to vastly improve individuals and organizations.

The elements and exercises provide you with an intellectual GPS to help you navigate through life. We have seen countless inspirational examples of people who flourish well beyond their own expectations. These stories feed our optimistic belief that we

all are capable of living our lives far more successfully than we generally do. Our hope is that students will find these elements transformative; instructors will use these lessons to enrich their classes; leaders of society, whether in business, science, politics, or the arts, will employ these strategies to become more innovative; and lifelong learners will apply these principles to better live as ever-evolving students of the world.

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