

# **EXCEED YOUR EXPECTATIONS THROUGH LIFELONG LEARNING**

*How Broader Knowledge Will Brighten Your Future*

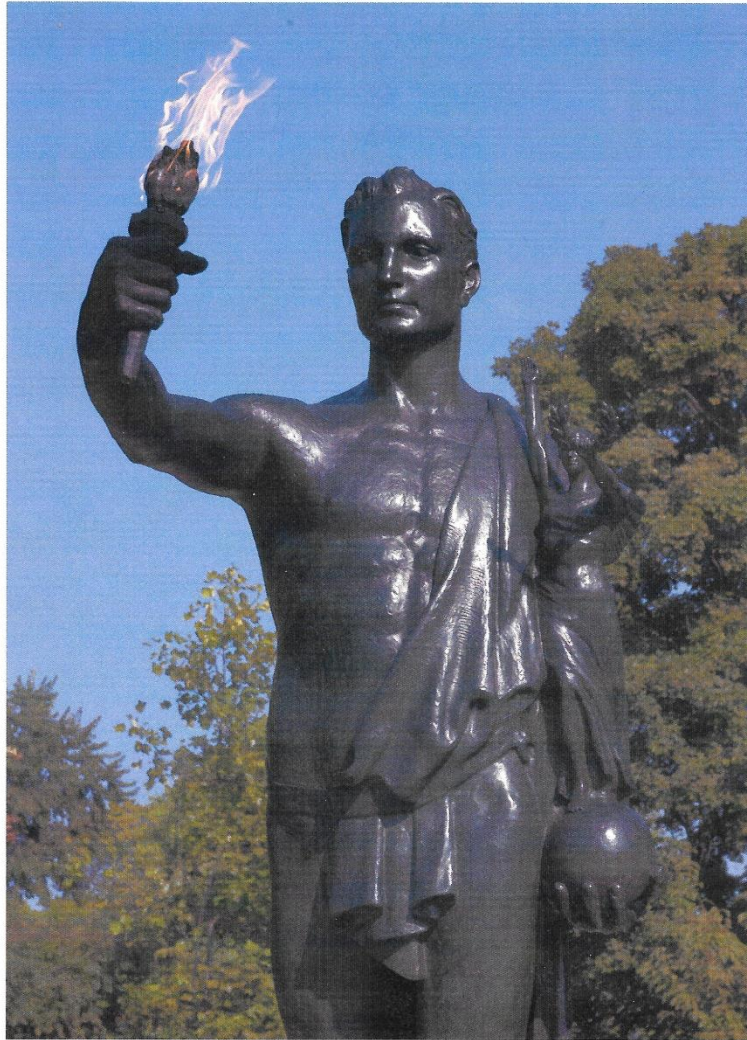
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**J. Michael Stone**

## Foreword

*Exceed Your Expectations Through Lifelong Learning* is a practical guide to help engineering graduates develop their professional skills. By professional skills, I am referring to an ability to negotiate, read body language, leadership skills, management skills, emotional IQ and maturity, communication skills, team building, an awareness of aspects of business such as finance, and other similar aspects of professional development. Engineers typically have a deficit of training upon graduation in these areas, and additional self-studied attention to these critical skills can set them apart for tremendous early-career success. The world's challenges have many facets, and an ability to see the challenges from angles beyond engineering will be increasingly valuable as we move forward.

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In his left hand, the Torchbearer holds Nike, the winged goddess of victory, who stands atop the earth. The Torchbearer thus symbolizes that the ability to achieve victory over the challenges of the world is in the individual's own hands. The Torchbearer's right hand symbolizes the inscription below the statue: "One that beareth a torch standeth in shadow to give light to others."

## What Students and Alumni Have Said . . .

**THE PERSPECTIVE AND ADVICE YOU** have given in this booklet is just what I have been searching for. In fact, I believe it is some of the most useful information I have obtained in my college career. I believe that lifelong learning could and will have a major impact on my personal success and the success of my coworkers. I can't say enough about how grateful I am for this booklet and the perspective you bring. — Austin Fullbright, BS/EE '15

**I THINK I SHARE THIS WITH A LOT** of current and previous students: I want University of Tennessee engineering students to be at the pinnacle of this profession. It is not going to be easy, but with a dedication to lifelong learning we can do this! As the saying goes, "Nothing worthwhile is easy." — Ryan Keever, BS/ChE '21

**I REALLY APPRECIATE THE TIME AND EFFORT** you have dedicated to developing young alumni such as myself. I hope that I am able to make an impact of similar magnitude as my career progresses. — Kristen Miranda, BS/ISE '18

**I LOVE THAT YOU HAVE TAKEN THE TIME** to put together this booklet for the success of future UT engineering alumni. I seriously thank you for adding just a bit more tinder to the fire in my belly. — Malcolm Miller, BS/ChE '20

**AFTER COMPLETING MY READING** of [the booklet], I sat and contemplated for the first time what I truly wanted out of my career, and my decision was clear. I want to be successful and I want to lead. — Warren Ottenfeld, BS/ChE '20

**ONCE WE GRADUATE, WE TEND TO THINK** that learning stops, but I've seen that learning only begins here. The quicker I learn more time management, personal development, interpersonal, and other skills, the better I will be able to serve my organization and do my job as a young engineer. — Xavier Dwayne Lee, BS/ChE '20

**I CAN TELL YOU ARE PASSIONATE** about helping others learn and grow. Thank you so much for being willing to share your knowledge and insights with us! I look forward to continuing to use it (the booklet) as I pursue continuous education and growth through my career. — Hope Michelle Newberry, BS/ChE '16

**THE BOOKLET HAS REAFFIRMED MY BELIEF** that an engineer with leadership skills and knowledge of general business and finance will have a successful career and more opportunities to move up the ladder. The numbers laid out in this booklet are astonishing, considering they are easily attainable if one dedicates a little time each day to lifelong learning. — Andrew Street, BS/ChE '19

**IF A COMMITMENT TO LIFELONG LEARNING** is simply an hour of reading a captivating book every day instead of mindlessly browsing a social media site, then I can't imagine a greater disservice to myself or my future than to let that call go unanswered. — Grayson Jones, BS/ChE '18



**I WAS REALLY IMPRESSED WITH THE AMOUNT** of things that resonated with me after being in the industry for just over a year. This is great material for someone just graduating from school, but I also found it to be a great refresher a year into the industry. — Geneva Osborne, BS/CE '17

**I CANNOT THANK YOU ENOUGH.** Your guidance and advice was some of the best I have ever had. — Spenser Knutson, BS/CE '20, Montana State University

**RECENTLY I HAVE BEEN TRYING TO FIGURE OUT** what my next steps in life should be in order to have a successful career, and the path you laid out in your booklet is exactly what I have been searching for. — William Fredebeil, BS/ME '17

**IT [THE BOOKLET] HAS OFFERED INSIGHT** and guidance on how I might grow myself professionally in the coming years. The booklet pushed me to take personal growth more seriously. — Daniel San Roman, BS/MSE '17

**I THOROUGHLY ENJOYED THE BOOKLET** and it has encouraged me to prepare myself for future success in my career. The booklet was a perfect way to wrap up my senior year. — Michael Bradley Ward, BS/ChE '17

**IT [THE BOOKLET] WAS A COMPLETE** eye-opener that blew me away. I believe your booklet will allow me to reach my full potential, and I cannot stress how grateful I am for having the chance to look at it. I feel like I now have a better understanding of the significance of lifelong learning. — Gabriel Geres, BS/ChE '15

**READING THE PAMPHLET TRULY HELPED** to solidify my plan to pursue a career in engineering business upon obtaining both my MSME and MBA. Reading of others' success in the booklet has inspired me to indulge in learning outside the classroom to help me broaden my horizons such that I may be more successful in the business world. — Ben Webb, BS/ME '15

**IT [THE BOOKLET] HAS UNDOUBTEDLY** given me a new motivation to find more time to read and learn more on my own time. Your book also helps reinforce a quote that I heard a while back and continue to revisit frequently: "The day you stop learning is the day you stop living." — Jordan Dotson, BS/ME '16

**I READ THROUGH THE BOOKLET** and I have to say, thank you. A majority of the talking points in the book, a recent graduate will not think about for at least another three to five years. You have really got me thinking about life after school. — Mathew Stinnett, BS/EE '14

**I ADMIRE YOUR DESIRE TO CONTINUE** in lifelong learning, and I think that in the world we live in today, it is needed to continually develop ourselves into better engineers and better people. — Travis Keever, BS/ChE, '16

**YOUR INSIGHT AND READING LIST** has given me a great deal of enthusiasm and ambition for my engineering career. Your guidance toward becoming a business savvy engineer is particularly interesting to me. I intend to follow your advice, either in independent study or in a formal MBA pursuit. Thanks again for your advice. I consider it highly valuable and am committed to developing into an exceptional engineer and businessman through lifelong learning. — Michael Shanahan, BS/NE '12

**I WAS BLOWN AWAY BY THE DEPTH** and structure that you presented for your reading and leadership plan. I will, without a doubt, take this plan very seriously as I go forward in the remainder of my college career and beginning my professional career. — Derek Watkins, BS/ChE '17

**DIVERSIFIED LIFELONG LEARNING EXPANDS** our level of understanding and allows us to make better decisions as each perspective feeds off the other. In a world that is constantly changing, single-mindedness is a thing of the past. — Tasimba Jonga, BS/ChE '22

**I WILL BE DELIBERATE IN MY FOCUS** on continuous education and overall professional development. I am fortunate to have been exposed to this concept at such an early point in my career, and I look forward to learning all I can about finances, business, leadership, and so much more. — Zoe Antonas, BS/ChE '20

**AS THE BOOKLET STATES, LEADERSHIP** is about more than your own personal success. I want to become a leader that paves the way for others to shine. — Muboso Nkosi, BS/ChE '20

**SOMEDAY I HOPE TO BE ABLE TO GIVE** scholarships to students, like this one, which help them find their true potential. Receiving this scholarship has given me confidence that I am capable of success, and I want to be able to grant that kindness to others in the future. — Rebecca Bozman, BS/ChE '21

**I AM CONVINCED IN ITS [THE BOOKLET'S] MESSAGE** and now have a “fire in my belly” to pursue a lifetime of learning. I am confident this journey will lead me to success and allow me to provide the best possible life I can for the ones I love. — Nathan Tidwell, BS/ChE '21

**I WANT TO BE ABLE TO HELP LEAD** people into unlocking their true potential and solving complex problems. This can only be done if I make the right decisions to self-educate early in my career so that when the opportunities for leadership or management roles open up in the future, I will be more than prepared to take on the challenge. I wish every engineer could read this booklet. — Prit Patel, BS/ChE '22

**I HAVE NO DOUBT YOUR BOOKLET** has and will create engineers and leaders that have and will achieve great things — the impact you have had and will have is awesome. — Brandon Chu, BS/ChE '22

**I AM DRIVEN TO BE A LEADER**, to be an executive, or maybe the founder of my own company. — Luke Pollack, BS/ISE, '23

**NOBODY HAS EVER SPECIFICALLY LAID OUT** a course of action for which I can follow to help me succeed and be considered more valuable as an asset and a leader compared to the rest of my peers. — John Reed, BS/ISE '23

**SOMEONE TOLD ME THAT ONCE** you get off the train of education, that is where you will settle for the rest of your life. Once you stop learning, that is where you will stay, but I never plan on stopping. This booklet gives me the tools to help me accomplish my goal. — Cailey Willingham, BS/ChE, '23

**TO BORROW FROM THIS MATERIAL**, the ability to provide for my family is my “hot button,” so if reading is a means to get me there, then I will stop at nothing to make that happen. — Jeffery Andrew Greer, BS/ChE '23

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## INTRODUCTION

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**AN ENGINEER IS HIRED** for his or her technical skills, fired for poor people skills, and promoted for leadership and management skills. — *Jeffrey S. Russell, Ph.D., P.E., University of Wisconsin–Madison, and James T.P. Yao, Ph.D., Texas A&M University*

Your engineering degree will unlock the door of opportunity for you. But in most cases your engineering knowledge *alone* will not be enough for you to rise to the upper levels of an organization. You will need a broader scope of knowledge and skills, and you will need to acquire these talents faster than your peers.

Perhaps you have no greater aspirations than to simply apply your engineering knowledge throughout your career. Taking on greater responsibilities such as managing people or large engineering projects are for other engineering professionals. If this describes you, do not stop reading just yet. First, consider the perils that could develop in your late 30s and early 40s.

Older “engineering-only” engineers are at great risk of losing their jobs simply because their cost per unit of output is higher than the cost per unit of output of recent engineering graduates. Plus, young engineers may develop into future leaders, whereas older engineers carry no such expectation. How likely is it that older engineers will suddenly develop management and leadership skills? If you choose this “engineering-only” path, you should save as much money as possible to help you through the last 40 to 50 years of your life. I am not aware of any other profession, including law, health care, finance, journalism, or education, where such a midcareer “brick wall” exists for average to below-average performers. The phrase “move up or move out” is especially applicable to the engineering profession. **This paragraph is perhaps the most important in this booklet.** Please take a moment to read it again and think carefully about the potential impact on you and your future family if your career is cut short because you failed to acquire a broader scope of knowledge. In a February 12, 2018, *Wall Street Journal* article, “The Secret to Midcareer Success,” Michael S. Malone of Santa Clara University reinforces the key points of this paragraph. The article is found in the Appendix.

All of this may sound somewhat shocking, but it is the likely outcome. **Employers believe that every young engineer they hire has the potential to develop into a responsible manager and leader.** Your engineering degree provides a 10- to 15-year audition for a management position. Engineers who fail the audition will find life more difficult than they expect. Those with greater aspirations and the determination to acquire broader knowledge and skill sets as discussed in this booklet will realize financial and personal achievements far beyond their expectations. **As you will learn in a later chapter, one hour a day devoted to reading and study could triple your career earnings.**

A brief overview of my career helps to illustrate the points made above. Knowledge in two important areas helped to accelerate my career, but lack of knowledge in another important area

created a multiyear delay in my advancement. Nevertheless, things turned out much better than if I had not broadened my knowledge.

About six years after I graduated from the University of Tennessee, my boss's boss ended a brief conversation with this advice. "Mike, if you want to get ahead in the business world, you need to be on chapter two while everyone else is on chapter one." This led me to enroll in a two-year business correspondence course. After I had completed the course, the company requested that I register as a Professional Engineer in the state of Louisiana.

To prepare for the PE exam, I studied several old exams that were available at the local library. The strong focus on engineering economics surprised me. This was my first exposure to the subject, and I found it very interesting. Over time, I continued to learn much more about financial analysis. Analyzing the financials of companies for my personal investments grew to become another interest.

With two growing strengths in broad business knowledge and financial skills, I began to stand out above other engineers. New opportunities developed. First, I searched for and analyzed acquisition candidates in Corporate Development. Later, I coordinated the development of strategic plans for all the diversified businesses of Kaiser Aluminum & Chemical Corporation. The exposure and experience from these opportunities led to another promotion.

Things were going according to plan until I was promoted to a position that required leadership skills far beyond my capabilities. The drive to succeed was there, but the skills were not. After a couple of years of heavy stress, I asked to be reassigned to a staff position. A few years later, I was once again promoted to a leadership position. It was not until after reading several books on leadership many years later that I fully understood and appreciated how leadership knowledge could have helped me during that challenging assignment.

These reflections have made it very clear to me that a good engineer can significantly enhance his or her career by becoming knowledgeable in three areas:

- Financial Analysis
- General Business
- Leadership

Knowledge of one or two areas is not enough, as my anecdotes about my various promotions suggest. All three are required for continued career growth and success, which usually translate into personal life enhancements as well.

The purpose of the following brief essays is, first, to show how acquiring knowledge in these three areas will help you advance professionally and personally. Second, these materials offer a practical game plan to achieve these goals. **The objective of this booklet is to instill in you a strong and enduring drive to acquire knowledge throughout your life, which is a critical component to achieving your full potential.**

**COLLECTIVELY, WE ARE MOVING** from a group of people who know it all to a group of people who want to learn it all. — *Satya Nadello, CEO Microsoft*

# THE BENEFITS OF A BROAD RANGE OF KNOWLEDGE

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## WHY LIFELONG LEARNING IS IMPORTANT

**WHAT'S IMPORTANT IN LIFE** is what you know and when you know it. — *Anonymous*

This statement sums up several key principles in continuing your education. The “what you know” part, of course, refers to any knowledge that makes you more valuable in your profession. The “when you know it” part has several implications. First, the sooner you begin acquiring knowledge in a specific area, the more rapidly you will be able to acquire additional and more complex knowledge in that field. Second, if you are more knowledgeable in a given area than your peers, you will stand out from the crowd. Finally, the sooner you acquire knowledge, the more time you will have to put that knowledge to work.

So, what subjects should an engineering graduate focus on? First, learn thoroughly the technology of your specific industry and stay abreast of new technical developments. Then, focus on three broad areas that will add considerably to your value:

- Financial Analysis
- Leadership
- General Business

**Your first objective always must be to demonstrate that you are an outstanding engineer.**

(If you do not excel in your field of study, why should anyone expect you to excel as a manager or leader?) This is true especially during the first one to three years of your career. Next, a promotion will come that not only requires engineering skills but also basic knowledge and skills in the three areas mentioned above. If you have already begun preparing yourself in these areas, you will handle your new assignment with ease. Management will be very impressed. This in time will likely lead to broader responsibilities requiring even more in-depth knowledge in these three areas. **Remember: You should always be preparing for your next promotion.**

In your first position, you will think of yourself as an engineer. After a couple promotions, you will think of yourself as an engineer with some business responsibilities. After one or two more promotions, you will think of yourself as a business professional with an engineering background.

Just as you are always preparing for your next promotion, a well-managed company is always preparing for its future as well. One key way companies do this is to continually identify employees who have high potential for advancement. Organizations are dynamic. People retire or leave, and new opportunities can quickly develop for this or other reasons. Because companies must fill these positions rapidly, they are almost certain to turn to their most promising current employees rather



than use a full-scale external search. Under these circumstances, wouldn't you prefer that management think of you rather than your colleague down the hall?

Most companies budget funds for training and development. Usually, these funds are not allocated to the "broad masses" of employees but to those identified as high-potential employees. It is crucial to be identified as such an employee as soon as possible.

Most highly successful leaders have understood the value of self-education. As stated in Blaine McCormick's *Ben Franklin's 12 Rules of Management*, "Without a plan for self-education, you'll be forced to rely on the generosity of others to help you keep up. Franklin knew this was folly" (30).

In *Straight from the Gut*, Jack Welch, a chemical engineer and retired CEO of General Electric, says that "I have always felt that engineering was one of the best backgrounds for a business career" (18).

In *Winning*, Welch states:

I learned mountains about business by reading every financial newspaper and magazine I could get my hands on. I still believe the business media is such a good teacher that I am always amazed when I meet a young person who doesn't just *consume* it. (293)

During a commencement address at Lehigh University, Ellen Kullman, former Chair of the Board and CEO of DuPont, said:

Lifelong learning will be more critical for you than any generation that has preceded you. . . . So today I urge you to avoid the temptation to think you're done. Instead, cultivation of the softer skills of persuasion, leadership, teamwork, and personal development should be kicking into a higher gear now. They will help you get your career started, and they are likely to determine where you end up.

A full copy of her address is provided in the Appendix.

A financial reporter once asked Warren Buffett what investment advice he would give to a young person. He replied, "The best investment advice I could give a young person would be to invest in yourself — and by that I mean acquire knowledge and skills that will help you in your profession." Someone also once asked Buffett to what he attributed his success. He replied, "Well, I read a lot." On another occasion, he was asked if he could wish for one special talent, what would it be? He replied, "I wish I could read faster." One of the world's most wealthy persons is saying that the acquisition of knowledge is the best investment anyone can make, and extensive reading is the best method in accomplishing that goal.



**Ellen Kullman**  
Former Chair of the Board and CEO of DuPont

*"I studied mechanical engineering and management. Back then, I did not think of myself as a leader or a strategist — but 30 years later, that's what I do. I recognized I had to learn to develop those qualities if I wanted to advance to the next level."*



**Dr. John W. Prados**  
**Vice President & University Professor Emeritus**  
**The University of Tennessee**

*“Employers emphasize that success as an engineer increasingly requires, in addition to strong technical capability, skills in communication and persuasion, ability to lead and work effectively as a member of a team, understanding of the non-technical forces that profoundly affect engineering decisions, and a commitment to lifelong learning.”*

The Vision and Mission Statement for the University of Tennessee Chemical and Biomolecular Engineering Department states that one of its goals is to ensure that graduates “are aware that lifelong learning is essential for prolonged superior performance in their chosen profession.”

The next chapter, “Who Benefits from Your Commitment to Lifelong Learning?,” discusses why lifelong learning is important in a much broader sense as well: that is, why it is important not only to you but also to many other people whose lives you will improve by the decisions you make now about your continuing education.

**FORMAL EDUCATION WILL MAKE YOU** a living; self-education will make you a fortune.

— *Jim Rohn*

**THE PLEASURES ARISING** from thinking and learning makes us think and learn all the more.

— *Aristotle*

**THE ABILITY TO LEARN FASTER** than your competitors may be the only sustainable competitive advantage. — *Arie de Geus, business theorist, former head of strategic planning, Royal Dutch Shell*

## WHO BENEFITS FROM YOUR COMMITMENT TO LIFELONG LEARNING?

**GIVE A MAN A FISH** and you will feed him for a day. Give him a fish hook and teach him to fish and you will feed him for the rest of his life. — *Anonymous*

Obviously, you will benefit — but not only you. Your commitment will also benefit those who matter the most to you, like your spouse and children, your family members and friends. You and your family will be more financially secure, for example, and your children will benefit by attending stronger schools. Your friends will feel inspired by your efforts and perhaps develop their own interests in lifelong learning. And mentees will learn from your role modeling and then mentor others.

Also, as you become more knowledgeable in many areas, your self-esteem and confidence will grow. You will feel good about the positive actions you are taking, knowing that you are making yourself a better person. Self-confidence is that little voice that says, “You’re on the right track; you’re doing the right things, and good things are going to come your way.”

Others beyond you and your close personal circle will also benefit. The employees who report to you will gain from your knowledge of financial analysis, leadership, and general business. You will be able to guide them in directions that will make them more valuable, productive, and motivated employees. And their enthusiasm and skills will reflect positively on you because a highly efficient and cohesive team usually achieves unexpected results.

Your company will also benefit. Your management and leadership skills will make the company more profitable than it would have been without your valued services. And your success will enhance the reputation of the Tickle College of Engineering at the University of Tennessee.

Finally, if you are as successful as I expect you will be, someday you will have excess funds to support programs to help others — perhaps even University of Tennessee

engineering students! **Your success will positively impact many others, and helping others is one of the greatest rewards of life.**

**ALL MEN OF REFLECTION**, from the age of Socrates, have sufficiently proved that the truest, most constant, and lively pleasure, the happiest enjoyment of life, consists in kind affections to our fellow creatures. — *Francis Hutcheson (1694–1746), Scottish philosopher and educator*

**THOSE WHO ARE HAPPIEST** are those who do the most for others. — *Booker T. Washington (1856–1915), American educator, author, and adviser to U.S. presidents*



**Alex Gorsky**  
Former CEO, Johnson & Johnson

*Managers who reported to Alex Gorsky were expected to answer their CEO's favorite question to direct reports: "Tell me the names of three to four people whose careers have been significantly enhanced by the development and mentoring you've provided them" (Leslie P. Norton, "Embracing the J&J Credo," Barron's, Dec. 16, 2013).*

## AN ESTIMATE OF THE VALUE OF LIFELONG LEARNING

Perhaps the best way to compare salary increases over different time horizons is to adjust the data for inflation, as measured by the Consumer Price Index (CPI). I will present two examples to help put this into perspective.

### My Experience

- 35-year career (1963–1998)
- Salary increased at 8.1% per year
- Average inflation (CPI) 4.9% per year
- Salary growth above inflation 3.2% per year

I might add that this was achieved without the benefit of superior intelligence. I graduated with just a 2.80 GPA in Chemical Engineering.

During my first 20 years, I spent the equivalent of one hour per day on self-improvement programs for approximately three years in the following activities:

- Two-year business correspondence course
- Preparation for Professional Engineer Exam
- Participation in Toastmasters International (public speaking training)

### Ivy League Graduates

I have extracted data from a January 2009 *Smart Money* magazine article regarding the salary growth of graduates from nine Ivy League universities.<sup>1</sup> From 1993 to 2005 (12 years after graduation), the average annual salary increase was 5.77% ( $\pm 1\sigma = 0.46\%$ ). The CPI over this same period increased by 2.60% per year. Thus, these graduates experienced a 3.17% per year increase *above* inflation. Since this survey includes all graduates, it is reasonable to assume that their engineering graduates might have done a little better.

### What Might an Average Engineer Expect?

Based upon my observations, an average engineer<sup>2</sup> from a non-Ivy League university can probably expect (over the long term) salary increases of about 1.0% above inflation. These average

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<sup>1</sup> Princeton, Yale, Harvard, University of Pennsylvania, Cornell, Bucknell, Brown, Colgate, and Columbia.

<sup>2</sup> My definition of an “average” engineer is one who is in the lower one-half of performance rankings. Typically, about 35% of engineers would be classified as “above average,” with the remaining 15% classified as “high potential.”

performers who do not invest in their professional development will likely have shortened careers. As discussed in the introduction, they will likely be terminated from their jobs in their late 30s or 40s. After termination, few companies will want to hire a 40-something engineer who has never advanced to broader responsibilities. As a result, these engineers often have to settle for much lower-paying (roughly 50%) non-engineering jobs.

It is my belief that by spending one hour per day for the first 10 years of a career on a self-study program, it is reasonable to expect an average salary increase of 3.0% to 3.5% per year above inflation (and perhaps even more) over an entire 42-year career.

The following analysis provides an estimate for total career earnings for engineers who do not pursue professional development versus those who do.

### *Assumptions*

- In all cases, inflation (CPI) ~ 2.5% per year
- Starting salary after graduation ~ \$70,000 per year

### *A. No Self-Study*

- Engineering Career: 22 years, annual salary increases of 3.5% (1.0% above inflation)

$$\text{Engineering Career Earnings} = (70,000) \frac{(1.035^{22} - 1.0)}{0.035} = \$2,263,000$$

- Second Career: 20 years, starting salary \$74,600 per year (50% of ending engineering salary), salary increase of 2.5% per year

$$\text{Second Career Earnings} = (74,600) \frac{(1.025^{20} - 1.0)}{0.025} = \$1,906,000$$

$$\text{Total Earnings} = \$2,263,000 + \$1,906,000 = \$4,169,000$$

### *B. Self-Study*

- Engineering/Management Career: 42 years

#### 1. Low Time Investment

- 3–4 hours per week, annual salary increase of 4.5% (2.0% + CPI = 4.5%)

$$\text{Career Earnings} = (70,000) \frac{(1.045^{42} - 1.0)}{0.045} = \$8,324,000$$

$$\text{Gained Earnings} = \$8,324,000 - \$4,169,000 = \$4,155,000$$

## 2. High Time Investment

- 7–8 hours per week, annual salary increase of 6.0% (3.5% + CPI = 6.0%)

$$\text{Career Earnings} = (70,000) \frac{(1.06^{42} - 1.0)}{0.06} = \$12,316,000$$

$$\text{Gained Earnings} = \$12,316,000 - \$4,169,000 = \$8,147,000$$

This probably sounds too good to be true. How could one hour a day spent on reading triple a person's career earnings? **The answer is simple: because so very few engineers make a similar commitment to lifelong learning.**

While you may believe the above figures are exaggerated, I actually believe they are conservative estimates. There are three reasons why you should be able to achieve annual salary increases greater than I achieved (that is, 3.2% above inflation):

1. You are smarter than I was at your age. I would have never been admitted to the Tickle College of Engineering under today's admission requirements.
2. I did not start self-study until about six years after graduation and I put in a total of about three years. You have the opportunity to start immediately after graduation and continue for the first ten years of your career. You should be able to acquire more knowledge than I did and acquire it sooner.
3. During most of my career, there were no books on leadership. No one believed that leadership could be taught or learned. Because of my leadership shortcomings at one point in my career, promotions stalled for about seven years. That is, I was not getting the extra salary boosts that come with promotions. You, on the other hand, have many great resources to use to develop your leadership skills.

Considering all these advantages you have, isn't it reasonable that you should be able to achieve salary increases greater than I achieved?

This analysis does not consider other financial benefits that derive from your base salary, such as 401(k) matching funds and stock options. If incremental earnings are invested with a reasonable return, total net worth at retirement will be much higher than it otherwise would have been.

Furthermore, continuing education will make work much more rewarding. You will be at the "initiating end" of major decisions rather than at the "receiving end." Also, you will have opportunities to positively influence many more people.

**I DON'T KNOW** of any university, including the ones I teach at, that tells its engineering students what to expect in the long term or how to manage their careers. Perhaps it is time to let students know what lies ahead. — *Vivek Wadhwa, Former Director of Research, Pratt School of Engineering, Duke University; Former Distinguished Fellow, Labor and Worklife Program, Harvard Law School*

# IMPORTANT AREAS OF KNOWLEDGE FOR ENGINEERING GRADUATES

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## FINANCIAL ANALYSIS

I believe that financial analysis should be your first learning priority. Within that area, make your initial focus *engineering economics*. Acquiring this knowledge will, first and foremost, make you a better engineer. But it will benefit you in other valuable ways too.

Every engineering problem has at least two or three viable alternatives, which often involve tradeoffs among capital costs, operating costs, and timing of cash flows. Determining the most cost-effective, lowest-risk alternative requires in-depth knowledge of engineering economics. Demonstrating expertise in this area will quickly distinguish you from your engineering peers.



### Real-Life Application

*Early in my career I was assigned to design, install, and start up a recovery system for a small but valuable amount of monomer. A continuous design was not practical or economical because of the low volumes, so I designed an automated batch operation that would operate 8 hours a day. When the plant manager pressed me to add an installed spare recirculation pump, I explained why this was unnecessary. (Since we had spare parts on site, repairs could easily be completed during the 16 hours that the equipment was idle.) After listening to my logic, he finally said, "The time we have wasted discussing this costs more than the spare pump. I want an installed spare!" When I explained to my boss why I was adding an installed spare, he agreed that my original argument was correct but also that I was right to give the plant manager what he wanted. Although I probably got under the plant manager's skin, both he and my boss knew that I was very serious about not wasting the company's money. I was soon promoted to a Project Manager and, in time, was given responsibility for larger and larger projects.*

However, these skills are not limited to engineering applications. **Financial skills apply to every aspect of business, and they will serve you well throughout your career as you advance to broader business responsibilities.**

In building strong financial skills, you must start with a solid understanding of accounting. This includes the balance sheet, income statement, and statement of cash flows. The important ratios derived from these statements give insights as to the financial strength and character of a business. Return on investment (ROI) is one of the most important measures of a company's long-term performance. **This metric should be central in every financial decision an engineer makes.** A solid understanding of economics is also critically important. As one rises higher and higher in an organization, financial knowledge must grow in both breadth and depth.

Two broad financial concepts determine the long-term success and viability of any business. First, the business must be wisely managed so that it generates a return on capital that meaningfully exceeds its cost of capital. That is, successful businesses make the most of the assets they have today. Second, management must wisely reinvest its profits back into the business to create future growth and profitability. Healthy companies make smart investments for the future. Engineers who have strong financial analysis skills are uniquely positioned to play very important roles in both of these areas.



Your developing financial expertise will help also with personal finances. Making shrewd investment decisions — whether in stocks, bonds, real estate, or other types of investments — depends on a solid understanding of finance and economics. Over the years, your net worth will grow much more than it would have without such specialized knowledge.

Many of the books recommended later in the “Reading Suggestions” chapter express similar themes. In *Engineering Economy*, the authors state:

Understanding and applying economic principles to engineering have never been more important. Engineering is more than a problem-solving activity focusing on the development of products, systems, and processes to satisfy a need or demand. Beyond function and performance, solutions must also be viable economically. . . . A great solution can die a certain death if it is not profitable.

The above quote can be summarized with this simple equation:

$$\text{GREAT ENGINEERING} + \text{BAD ECONOMICS} = \text{ZERO}$$

Jack Welch’s rise was fueled in part by his finance and economics skills, which he acquired very early in his career. In *Winning*, he discusses the importance of giving people more than they expect, but he could not have delivered that without a solid foundation in financial analysis and economics.

I learned this lesson for myself my first year at GE, while I was still working in the laboratory, developing a new plastic called PPO. A vice president was coming to town, and my boss asked me to give him an update on our progress. Eager to impress both of them, I stayed up late at work for a week, analyzing not only the economics of PPO, but of all the other engineering plastics in the industry. My final report included a five-year outlook, comparing the costs of products made by DuPont, Celanese, and Monsanto, and outlined a clear route to a competitive advantage for GE. My boss and the VP were surprised, to put it mildly, and their incredibly positive response showed me the impact of giving people more than they expect. (281)

I’d be willing to bet that this event set the stage for Welch’s rapid rise to the top at General Electric.

Senior-level executives devote a lot of attention and effort in developing capital and operating budgets. (Executives involved in these critical decisions are well versed in accounting, finance, and economics.) They do this because wise spending is vital in every business. Young engineers who demonstrate financial maturity (careful avoidance of wasteful and low-value spending) and financial sophistication (the ability to properly evaluate the financial potential of complex projects, including risk assessment, various alternatives, and integration of business strategy) are quickly noticed by upper management. Early promotion decisions are often based primarily upon these skills.

Finally, let me say that financial analysis should not be a difficult challenge for you. As an engineer, you have the brainpower to master this subject. **Your financial knowledge in combination with your engineering knowledge will make you a very valuable corporate resource.**

## LEADERSHIP

**IF YOUR ACTIONS INSPIRE OTHERS** to dream more, learn more, do more, and become more, you are a leader. — *John Quincy Adams*

“At XYZ Company, our people are our most valuable assets.” How often have you heard this statement? It’s so obvious that it hardly needs to be said. **But the exceptionally valuable assets are those people who have the skills to lead, motivate, encourage, and develop others.**

The value of leadership and people skills (soft skills) was clearly stated in a *Wall Street Journal* article (Aug. 31, 2016) in which the author writes, “In a Wall Street Journal survey of nearly 900 executives last year, 92% said *soft skills were equally important or more important than technical skills.*” (The full article is found in the Appendix.) **Employers want good engineers for the short term but, more importantly, great leaders for the future.**

As James Kouzes and Barry Posner write in *The Leadership Challenge*, “In uncertain times, leaders with a positive, confident can-do approach to life and business are desperately needed” (349). Leadership skills *can* be learned. Kouzes and Posner continue:

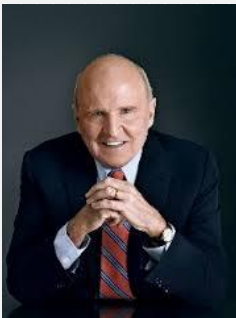
It’s just pure myth that only a lucky few can ever understand the intricacies of leadership. Leadership is not a gene, and it’s not a secret code that can’t be deciphered by ordinary people. The truth is that leadership is an observable set of skills and abilities that are useful whether one is in the executive suite or on the front line, on Wall Street or Main Street, in any campus, community or corporation. . . . It’s not the absence of leadership potential that

inhibits the development of more leaders, it’s the persistence of the myth that leadership can’t be learned. This haunting myth is a far more powerful deterrent to leadership development than is the nature of the person or the basics of the leadership process. (339–40)

Developing leadership skills at an early age not only will facilitate racing ahead of peers, but also will benefit others. As Kouzes and Posner state, “If you want to have a significant impact on people, on communities and on organizations, you’d be wise to invest in learning to become the very best leader you can” (343).

After you read several leadership books like the ones just quoted, you will begin to develop a clear understanding of what personal characteristics create successful leaders.

**In my opinion, one of the most important characteristics of a successful leader is a positive, can-do attitude.**



**Jack Welch**  
Business Executive, Author, Chemical Engineer

*“If there is anything I would like to be remembered for it is that I helped people understand that leadership is helping other people grow and succeed. Leadership is not just about you. It’s about them” (Welch, Winning, 359).*

Jim Rohn's *The Five Major Pieces to the Life Puzzle* also emphasizes the importance of attitude:

The feelings we carry within us about people, our work, our homes, our finances, and about the world around us collectively form our attitude. With the right attitude human beings can move mountains. With the wrong attitude they can be crushed by the smallest grain of sand. Having the right attitude is an essential prerequisite for success and happiness. (47)

A commitment to lifelong learning is another characteristic that strong leaders share. Kouzes and Posner stress in *The Leadership Challenge* that “the more you're engaged in learning, the more successful you are at leading — and at just about anything.”

Similarly, in *Leaders: Strategies for Taking Charge*, Bennis and Nanus explain:

Leaders are perpetual learners. Learning is the essential fuel for the leader, the source of high-octane energy that keeps up the momentum by continually sparking new challenges. It is absolutely indispensable under today's conditions of rapid change and complexity. Very simply, those who do not learn do not long survive as leaders. (176)



#### Reading Tips

*I believe The Leadership Challenge, The Truth About Leadership, How Successful People Lead, and Creating Magic are the best books I have read on this subject. I suggest reading them first and early in your career. Also review them every three or four years. Some chapters may mean more as you gain life experience.*

These concepts are summarized by Anthony Bell in the fall 2010 issue of *Leader to Leader*:

No one becomes a great leader by chance. Great leaders are great learners; they study great leadership. They read. They ask questions. They take notes and keep a journal. They test and challenge their own assumptions. They make mistakes and learn from them. (“The Myth of Generational Tensions” 10)

**BEFORE YOU ARE A LEADER**, success is all about growing yourself. When you become a leader, success is all about growing others. — *Jack Welch*



#### First Steps in Demonstrating Leadership Potential

- *Engage in discussions during meetings.* (See Appendix, Engineering Perspective)
- *Develop excellent presentation skills.* (The Articulate Executive)
- *Make extra efforts to be friendly, supportive, considerate, and thoughtful.* (How to Win Friends and Influence People)
- *Act in ways that demonstrate leadership potential.* (The Charisma Myth and Executive Presence)
- *Become skilled at reading body language.* (What Every BODY Is Saying)
- *Demonstrate excellent conversation skills.* (Conversationally Speaking and Conversational Intelligence)

## GENERAL BUSINESS

A successful manufacturing business consists of numerous departments, all of which must be managed effectively and efficiently. A partial list of organizational units would include the following departments:

- Accounting & Finance
- Engineering
- Manufacturing
- Personnel Management
- Purchasing
- Research & Development
- Transportation & Distribution
- Corporate Development
- Legal
- Marketing & Advertising
- Public Relations
- Quality Management
- Sales

Every one of these units plays a vital role in the success of a business. Each has a unique set of complex and challenging objectives, which you cannot fully appreciate until you learn much more about their details. All can be managed poorly or exceptionally well. The difference can be huge with respect to the business's overall success. A manager in manufacturing who finds a way to save \$1 million a year is no more (or less) important, for example, than a manager in sales and marketing who develops an advertising campaign that generates an additional \$1 million a year in profit.



### Reading Tip

*The best book I have found that will give you a head start in understanding company departments and organization is the AMA Management Handbook, published by the American Management Association.*

The more you learn and understand the details of these various units, the better manager you will become. As people within these departments realize that you understand and appreciate the challenges and complexities they face, you will gain their respect. This will allow you to work more effectively with them.

In addition to understanding the inner workings of the various departments within a business, it is important to possess a strong knowledge of general business topics like economics and business strategy in addition to international economic and political trends.

Broad knowledge of business along with your financial knowledge will help you develop a "think like an owner" mindset. This mindset means that you frequently ask yourself, "What would I do if I owned all or part of this business?" When you make recommendations or take actions that reflect this mindset, you will be quickly noticed by your superiors and your chances for promotion will be significantly improved. The "Real-Life Application" on page 10 as well as the Jack Welch story on page 11 are both good examples of how a "think like an owner" mindset can pay off.

People who have broad business knowledge and a "think like an owner" mindset are very rare. Making yourself one of these rare individuals will push you ahead of peers who have not. To accomplish this will require a combination of self-study along with on-the-job experience. The process will take many years. When a board of directors selects an individual to be president of a company, it does so in part because that individual has demonstrated a broad and in-depth knowledge of *all* aspects of a business. But whether you rise to that level or not, broad knowledge of business will make you a much more valuable and successful employee. This will be more apparent in the next chapter, "The Power of Diversified Knowledge."

## THE POWER OF DIVERSIFIED KNOWLEDGE

Over the last several years, I have searched extensively for books that will significantly benefit recent engineering graduates. I have read much about the tremendous value of having a wide scope of knowledge. Peter Drucker, who is widely recognized as the father of modern management, captures this idea in his *The Essential Drucker*. “Managers draw on all the knowledges and insights



**Charles Munger & Warren Buffett**

*In Poor Charlie’s Almanack, Munger writes, “In my whole life, I have known no wise people (over a broad subject matter area) who didn’t read all the time — none, zero. You’d be amazed at how much Warren reads — and how much I read. My children laugh at me. They think I’m a book with a couple of legs sticking out” (Munger, 6).*

of the humanities and the social sciences — on psychology and philosophy, on economics and history, on ethics, as well as the physical sciences” (13).

The power of diverse knowledge was first revealed to me when I read Charlie Munger’s autobiography, *Poor Charlie’s Almanack*. Charlie Munger has been Warren Buffett’s right-hand man for more than 50 years. He is a billionaire in his own right, and he has been very instrumental in the financial success of Berkshire Hathaway. Buffett has said that he has never known anyone who can evaluate a problem/opportunity more quickly and with more insight and thoroughness than Charlie Munger. Considering all the brilliant people Buffett has known and worked with, that is quite a compliment! So how did this Harvard Law School graduate become such a valuable ally of Warren Buffett?

First, Munger committed himself to reading broad-based, diversified subjects:

You must know the big ideas in the big disciplines and use them routinely — all of them, not just a few. Most people are trained in one model — economics, for example — and try to solve all problems in one way. You know the old saying: “To a hammer, the whole world looks like a nail.” This is a dumb way of handling problems. (55)

Although simple, Munger’s hammer analogy contains much wisdom. A person who has knowledge in engineering, economics, law, psychology, philosophy, history, mathematics, leadership, and many other areas has a full set of tools to analyze problems and opportunities, rather than just a single tool. As you face the challenges and opportunities of life, would you prefer a toolbox with just a hammer or one that also carried a saw, screwdriver, crescent wrench, flashlight, voltmeter, hacksaw, shovel, tape measure, level, and Allen wrenches? Just as a house cannot be built with only one tool, solving complex problems also require multiple “knowledge tools.”

Second, Munger’s diversified reading program has allowed him to build what he calls “Multiple Mental Models,” which complement each other and provide the foundation for good analysis and good decisions.

[Munger's] Multiple Mental Models (about one hundred in number, he estimates) provide a context or "lattice work" that leads to remarkable insights as to the purpose and nature of life. His models apply the analytical structure that enables him to reduce the inherent chaos and confusion of a complex investment problem into a clarified set of fundamentals. The net result of this broad-spectrum analysis is a heightened understanding of how the many factors affecting an investment candidate blend and link to one another. (56)

Charlie painstakingly created his own largely self-taught system. The "self-taught" statement is no exaggeration; he once said, "To this day, I have never taken any course, anywhere, in chemistry, economics, psychology, or business." And yet, these disciplines — especially psychology — form the foundation upon which his system is built. (59)


Two other valuable resources that demonstrate the power of diversified knowledge are James Surowiecki's book, *The Wisdom of Crowds*, and Michael A. Roberto's DVD lecture series, *The Art of Critical Decision Making*. Both show how the best decisions are made when a group of people with diverse backgrounds, experience, and education are brought together. To be most effective, they must communicate and exchange ideas with as little constraint as possible from "peer pressure" and/or "group think."

Diversified knowledge, in fact, almost certainly affected history during World War II, when the British assembled a team to break the incredibly complex German *Enigma* code, used to transmit messages. Some very wise leaders brought together a team of mathematicians, classics scholars, chess grand masters, finance experts, scientists, linguists, and even bridge experts. This vital mission was successful because each member contributed unique and varied insights that a less diversified team could have missed.

While considering making an investment in Union Pacific, I ran across an article (*Barron's*, Jan. 26, 2015) that featured UP's former CEO, John J. Koraleski. The following quote helped to convince me to invest in the company:

We have an appreciation of diversity that goes way beyond race and gender. We want people from different backgrounds with different experiences and educational backgrounds to bring different perspectives to the table. That's where creativity and innovation and competitive advantage come from.

As I have previously said, after you have obtained your engineering degree, I believe your first learning focus should be in the areas of financial analysis, leadership, and general business. Knowledge in these areas will have the greatest near-term impact. Longer term, then, after you have mastered these three important principles, *diversify your reading program*. Include, for instance,



**Enigma Code Machine**

*The Oscar-nominated film The Imitation Game (2014) portrays the diverse team assembled to break the German Enigma code. Led by mathematician Alan Turing, the team races to break the German code before Britain and its allies lose the war.*

*Alan Turing: "I'm just a mathematician."*

*Joan Clarke: "Sometimes it is the people who no one imagines anything of who do the things that no one can imagine."*





**Reading Tip**

*David Epstein's book, Range: Why Generalists Triumph in a Specialized World, reinforces, with data, the key concepts of this chapter. The inside flap reads, "In most fields — especially those that are complex and unpredictable — generalists, not specialists, are primed to excel. They're also more creative, more agile, and able to make connections their more specialized peers can't see."*

*If you have any doubt about the power of diversified knowledge, please read this book.*

psychology, philosophy, and history, which will add breadth and diversity to your scope of knowledge. Time will show how all of these “tools” will greatly increase your effectiveness and value as a rising engineer. Most organizations do not have any “Charlie Mungers” in their ranks so, in order to deal with complex issues, they must assemble teams who collectively possess broad, diversified knowledge. **If you possess broad, diversified knowledge, it should be obvious how exceptionally valuable you will become.**

**ALL HUMAN BEINGS BY NATURE** yearn for knowledge. — *Aristotle*

## EMOTIONAL INTELLIGENCE

**ANYONE CAN BECOME ANGRY** — that is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose, and in the right way — that is not easy. — *Aristotle*

Emotional intelligence falls under the broad umbrella of psychology. It relates first to our ability to recognize, understand, and manage our own emotions, and second to recognize, understand, and manage the emotions of others. Recall that Charlie Munger (introduced in “The Power of Diversified Knowledge”) believes that psychology is the most important discipline among his many areas of knowledge.

Common emotions such as happiness, sadness, anger, fear, and shame range in intensity from high to medium to low. Thus, the study and understanding of emotions involves a significant amount of variety and complexity.

In my experience, many engineers tend to seriously underestimate the importance of people skills in the work environment. **Developing emotional intelligence skills will be a key factor in your future success.** Most people want more from their jobs than just financial benefits. They want to feel that their work is important and that they are making valuable contributions. They want to respect their coworkers and supervisors, and to work with people who are cooperative, supportive, and positive in outlook and attitude. Most of all, they want to be part of a winning team. You want these things, and so do those you work with. You must do your part to help other team members realize these objectives.

Many of the excellent books in the “Reading Suggestions” chapter detail the importance of emotional intelligence. Malcolm Gladwell’s *Outliers*, for example, discusses a long-term study conducted by Lewis Terman, the Stanford psychology professor who created the standard IQ test. Terman identified 1470 children whose IQs averaged more than 140. For most of his life, Terman tracked, measured, and analyzed this super-intelligent group. At the beginning of his study, he was confident that this group of children would *all* grow up to become very successful. After exhaustive evaluation of every conceivable variable that could impact success, in addition to IQ scores, he wrote, “In the end, only one thing mattered: family background.” That is, IQs above 110 to 120 had practically no impact on the success these children achieved. “You’re simply seeing the difference between those schooled by their families to present their best face to the world,” Terman concluded, “and those deprived of that experience.”

Further insight into the importance of good parents is revealed in Daniel Goleman’s book *Emotional Intelligence*:

Only recently, though, have there been hard data showing that having emotionally intelligent parents is itself of enormous benefit to a child. . . . Thus the payoff for children whose parents are emotionally adept is a surprising — almost astounding — range of advantages across and beyond the spectrum of emotional intelligence. (190)

And on page xv, Goleman says,

EI (Emotional Intelligence) abilities rather than IQ or technical skills emerge as the “discriminating” competency that best predicts who among a group of very smart people will lead most ably. If you scan the competencies that organizations around the world have independently determined identify their star leaders, you discover that indicators of IQ and technical skills drop toward the bottom of the list the higher the position. (IQ and technical expertise are much stronger predictors of excellence in lower-rung jobs.)

This is reconfirmed in Travis Bradberry and Jean Greaves’s book, *Emotional Intelligence 2.0*.

EQ (Emotional Intelligence) is so critical to success that it accounts for 58 percent of performance in all types of jobs. It’s the single biggest predictor of performance in the workplace and the strongest driver of leadership and personal excellence. (21)

Another especially worthwhile book in “Books for Your Consideration” is *The Charisma Myth* by Olivia Fox Cabane. The book could have been titled *Applied Psychology* because its value is much broader than just improving readers’ charisma. Anyone who enthusiastically studies and follows its guidance will be richly rewarded. I believe psychology is a very important foundation for developing leadership skills just as chemistry is a very important foundation for chemical engineering skills.

Emotional intelligence skills are demonstrated through our interactions with others, and the primary way we interact with others is through conversations (both oral and written) as well as body language and tone of voice. Judith Glaser’s book, *Conversational Intelligence: How Great Leaders Build Trust and Get Extraordinary Results*, will give you valuable insights into shaping and guiding conversations (both individually and in groups) so that the best outcomes are achieved. Glaser states:

In the way that emotional intelligence focuses on self-regulation, Conversational Intelligence focuses on *co-regulation*, one of the most powerful tools for leaders, teams, and organizations to learn for success in the twenty-first century. (116)

Regardless of your parent’s emotional intelligence, you can reach a high level of EI by reading the above-mentioned books and many others. Acquiring knowledge in this area will provide a very high return for your effort. You will improve not only your chances of success but also your children’s chances for success. As Goleman writes in *Emotional Intelligence* (inside flap), “Although shaped by childhood experiences, emotional intelligence can be nurtured and strengthened throughout adulthood — with immediate benefits to our health, our relationships and our work.”

**LIFE IS 10 PERCENT** what happens to you and 90 percent how you respond to it. — *Lou Holtz, retired collegiate football coach, 2020 recipient of Presidential Medal of Freedom*

**A SMART PERSON KNOWS** what to say. A wise person knows whether to say it or not. — *The Dalai Lama*

## A SUGGESTED PLAN FOR CONTINUING EDUCATION

My suggestion is to start continuing education with a simple plan, one that will not require a large amount of time. Continuing education should not rob time from your job or family obligations. This simple plan involves starting with a basic collection of books — related to financial analysis, leadership skills, and general business — and dedicating 60 to 80 minutes a day, seven days a week, to reading and studying those books. It is best to set aside the same time each day for studying. I found early in the morning was best because at that hour I had no other distractions. I was rested, and my mind was fresh.

I suggest that, for the first year or two, you concentrate primarily on financial analysis (40-50%), next on leadership (30–40%), and, with your remaining time, on general business.

I also suggest maintaining a self-study program for at least the first 10 years of your career. However, since learning is such a wonderful investment, I hope you make a commitment to lifelong learning. In my case, I studied for only about three years. Had I known better, I would have started earlier and continued longer. Nevertheless, those three years of effort made a significant difference in my life and career. There would be no John W. Prados Scholarships today had I not spent the time I did on self-education.

Public speaking is a key leadership skill, a skill where there is always room for improvement. One excellent way to develop this skill is to join a local Toastmasters International club. Toastmasters is a structured public-speaking program that operates through local chapters. Each chapter is simply a group of people who are proactive in developing their leadership and public-speaking skills. This experience will be very effective and will facilitate meeting some interesting people. Google "Toastmasters International" to learn more.

Dr. Allen Kozinski, Ph.D. Chemical Engineering, University of Wisconsin, and I were members of an angel investors group. Once while I was discussing the objectives of the Prados Scholarship program, he mentioned an article he had written titled "Appraisal by Impression." In it he states, "I have observed that a distinguishing characteristic between successful and not so successful, but equally able engineers and scientists has usually been outstanding communication skills." His article is included in the Appendix.

Another developmental activity would be to begin making small investments in one or two publicly traded companies. Career-related industry companies might be a good place to start. The process of selecting a company will put some of the things learned from reading and coursework into practice. For example, determining whether a company's stock price is a good value given the company's current performance and future prospects will help you to develop financial analysis skills. Knowledge of business and business strategy will grow when you determine whether a company has a strong competitive position in a strong market and delivers unique values to its



### Real-Life Application

*People with a master's degree who have degrees in both engineering and business were twice as likely to be in senior management as people with a master's who have only engineering degrees.*

*— National Science Foundation,  
Dec. 31, 1998*

customers. Knowledge of leadership is necessary to evaluate the capabilities of a company's top management regarding knowledge, confidence, vision, competence, credibility, and ability to motivate. The best way to gain insight is to listen to recorded earnings conference calls and business presentations. They can be found on a company's website under headings like "Investor Relations."

This all comes down to a race to acquire knowledge faster than your peers. **You must demonstrate that you are wiser, more mature, and more committed to your professional development than other engineers your age.**

This booklet discusses the knowledge and skills you need to acquire. The next question is what methods of learning are best suited for you. Books should be your primary source of knowledge, which you can either read or choose an audio version. Online videos are another excellent source of knowledge. Those can include TED Talks as well as complete online college courses, which are often free. Participating in local self-development groups such as Toastmasters or book clubs are not only effective but also great ways to develop new friendships. **I encourage you to not think of your personal development program as a chore but rather an exciting adventure in the acquisition of knowledge.**

A very important goal for you to consider is to develop a job performance record (based on high job performance ratings, personal development efforts, and promotions) that results in your company selecting you for an Executive MBA Program at a top university. This would be the ultimate confirmation that your company considers you to be a very high-potential employee. If you can reach this goal and acquire your MBA through a company-sponsored program, you will be well on your way toward a very successful career! **Most very successful engineers make the transition from engineering to supervision sometime during the first 10 years after graduation.**

I suggest you first analyze how you use your time throughout the day. Then allocate your least productive hour to personal development activities. **Imagine the impact on your life if you convert the least productive hour of your day into the most!** According to a November 2019 article in *Entrepreneur* magazine, "The most successful people on the planet are also the people most likely to devote an hour a day to reading and learning" (<https://www.entrepreneur.com/article/317602#>). (See the Appendix for a related article, "Why Constant Learners All Embrace the Five-Hour Rule.")

**KNOWLEDGE BUILDS UP** like compound interest. — *Warren Buffett*

## ADDITIONAL PERSPECTIVES

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### HOW OFF-THE-JOB LEARNING ACCELERATES ON-THE-JOB LEARNING

On-the-job learning will be a very important part of your growth and development. Unfortunately, not all on-the-job learning opportunities are created equal. Some individuals are fortunate to have work experiences that provide a variety of learning opportunities and a supervisor who is proactive in providing his or her direct reports extra learning experiences. Most others are not as fortunate.

On-the-job learning opportunities are, for the most part, random and unpredictable. You have little control over what you will learn and when. And your learning experiences are unlikely to cover all the important areas in a proper scope and depth. To paraphrase Forrest Gump, on-the-job learning is “like a box of chocolates. You never know what you’re gonna get.”

**A very important aspect of on-the-job learning is that your learning opportunities accelerate with each promotion.** A promotion brings a wider scope of responsibilities, which often includes supervision of direct reports, responsibility for budgets and spending control, greater interactions with people higher in the organization, and often interactions with suppliers and customers. These experiences and responsibilities will force you to learn at a faster pace and over a broader scope. Thus, the best and most effective thing you can do to accelerate your on-the-job learning is to *get promoted!*

Getting a promotion first requires that you exceed expectations with regard to your current and past assignments. A second and very important factor is that you have demonstrated the skills and knowledge that will be needed at the next level. As discussed above, you cannot rely on your on-the-job learning to provide these skills and knowledge. *Off-the-job learning* is the answer to this problem. You can decide what knowledge and skills you need to develop and then take action by reading applicable books, listening to online lectures, attending seminars, and developing public speaking skills by joining your local Toastmasters club.

Your proactive off-the-job learning can also open up new on-the-job learning opportunities. For example, if your supervisor is aware that you are participating in a Toastmasters group, he or she is more likely to approve your request to attend internal and/or external leadership programs. **Also, your supervisor's knowledge that you are being proactive in broadening your skills and knowledge will significantly increase your chances of being promoted.**

The key take-away is to always be proactively preparing yourself for your next promotion so you will be able to handle your new assignment professionally and effectively and begin setting the stage for your next promotion!

$$A = K \times E$$

This simple equation is a reminder of something you probably already know:

$$\text{Accomplishment (A)} = \text{Knowledge (K)} \times \text{Effort (E)}$$

When you use a small portion of your effort (E) — (perhaps 3–5%) to acquire new knowledge, you will increase your lifetime accomplishments. That is,

$$(E) \times (.04) \times (I) = \Delta K$$

Where: I = Intelligence and  $\Delta K$  = New Knowledge

These mathematical expressions can help you visualize the importance and value of always acquiring new knowledge ( $\Delta K$ ). It is important to reemphasize that “knowledge” must be broad based and diversified, as discussed in “The Power of Diversified Knowledge.” As new knowledge grows over the years, your lifetime accomplishments will far exceed what you otherwise would have accomplished.

This reinvestment in oneself is akin to what successful and growing businesses do. They reinvest part of their profits into the business by making wise investments in new working capital, fixed capital, and acquisitions, as well as in research and product development. These investments create future growth and vitality. Similarly, you can reinvest in yourself through lifelong learning, to create future growth and vitality in your career.

The equation suggests that E and K are equally important, something I would be hard pressed to argue against. This booklet is primarily about acquiring knowledge (K) that will be of great value in your career. Effort (E) is a more subjective concept, but I believe it directly relates to motivation. What will best motivate you in a powerful way is unique to you. It will usually be something you desire to achieve or wish to avoid very badly. If you read something or someone says something that pushes your “hot button,” consider yourself lucky.

Let me share an experience. The most motivational statement ever made to me occurred when I was about 30 years old. A salesman said, “Mike, you have a good job, a wife, and two young sons. You have an obligation to do the very best you can to provide your family a financially secure and happy life. The best thing you can do right now to accomplish that is to sign up for and complete this business correspondence course.” He hit my “hot button” big time.

I want to encourage you to always be looking for those special words and situations that elevate your spirit and determination in meaningful and powerful ways.



**Lou Holtz**  
Retired Collegiate Football  
Coach, 2020 Recipient of  
Presidential Medal of Freedom

*“Ability is what you’re capable of doing. Motivation determines what you do. Attitude determines how well you do it.”*



**Ty Cobb**  
Hall of Fame MLB Player



*"I never could stand losing. Second place didn't interest me. I had a fire in my belly."*

## **FIRE IN THE BELLY**

Most engineering students have, to some degree, a fire in their bellies. Obtaining an engineering degree is not easy, and students must have some internal drive that motivates them toward that goal rather than taking an easier path. It is important to understand what creates a fire in different people's bellies to help evaluate the intensity of the fire in your own belly. With such understanding, you should get some ideas about how to ramp up your fire.

Examples of what motivates people are plentiful. What strongly motivated me to get my chemical engineering degree, for example, was the realization that if I failed, I would end up back on the farm. That was not the future I wanted. After I married and had two young sons, the fire in my belly was to provide financial security for my family. I never wanted to come home one day and have to tell them that I had been fired. Both of these drivers were negative in nature. That is, I was strongly driven to prevent a negative outcome. At the current stage of my life, I am driven in a positive manner. **The fire in my belly now is to help engineering students achieve their full potential and accomplish much more in their lives than they otherwise would.**

Many people are driven to prove something to someone, such as a parent, sibling, or someone who may have disparaged them. A good example of this is a University of Tennessee industrial engineering graduate named Chad Holliday. When he was in high school, he told his career counselor that he wanted to be an engineer. His counselor responded by saying, "Chad, you're not smart enough to be an engineer." Holliday rose to become CEO and Chairman of the Board at DuPont, later served as Chairman of the Board at Bank of America, and then as Chairman of the Board at Royal Dutch Shell. Since leaving Royal Dutch Shell in 2021, he has served on several boards of directors, including as Co-Chair at Mission Possible Partnership. Can you guess what probably lit a fire in Chad Holliday's belly?

A similar story can be told about Larry Ellison, CEO of Oracle. His adoptive father frequently reminded him that he would never amount to anything. Ellison said in an interview, "Oh, it was a powerful motivation. I think my dad had a powerful effect on me."

Some people who grow up in poverty or near poverty are strongly driven to succeed so that they will never return to that situation again.

There are many examples of children who have lost a parent at an early age and then go on to a very successful life. This could be because they were forced to mature at an early age by taking on some of the responsibilities of the lost parent, like taking care of younger siblings, helping with household chores, and earning money any way they could. Such individuals develop an internal drive that says, "If it is going to get done, I will have to do it."

Others who are fortunate to have exceptional parents are taught good manners and good conduct. They are guided and taught to always do the best they can at any task they pursue, and they are encouraged to outperform their peers. The subconscious fire in their belly is to not disappoint their parents. Over time, these attributes become hardwired in their brain. These high achievers maintain these standards of performance throughout their lives.

In Rich Karlgaard's article (*Forbes*, June 29, 2016) about Pat Gelsinger, former CEO of VMware and current CEO of Intel, he asks, "Why, then, do the majority of smart and talented people manage to get stuck?" Gelsinger replied, "If you asked ten people if they want to improve themselves, eight will say yes. But only two will follow through. Which means a majority of people . . . lack the know-how, energy or discipline to move forward." (The full article is found in the Appendix.)

I believe Gelsinger is much too optimistic. Most students who receive this booklet will not even read it. Probably fewer than one in ten who read it will follow through. **Are you the one in ten who has a strong enough fire in the belly to follow through?** When you finish reading this booklet, will you outline a long-term self-development plan *and* then follow through on it after you graduate? If you do, you are very likely to rise to the level of vice president, senior vice president, executive vice president, chief operating officer, chief executive officer or chairman of the board. These highly rewarding jobs (both financially and personally) are not delivered on a "silver platter" to all those who show up to their engineering jobs, work hard all day, and go home. **They go to those who make a determined and persistent effort to continually develop the knowledge and skills required for these top-level positions.**



#### Reading Tips

*If you feel you need some motivation and a strategy or game plan for your personal development program, I would highly recommend you read The Five Major Pieces to the Life Puzzle: A Guide to Personal Success by Jim Rohn, and How Successful People Grow by John C. Maxwell.*

If you are unsure about the fire in your belly, ask yourself the following questions: Am I dissatisfied with the status quo? Do I expect and want things to be much better in the future than they are today? If your answer to both of these questions is "yes," you probably have a fire in your belly. I would encourage you to think more about that fire in your belly. What is really motivating you now and why? Is there any way you can intensify that fire? As you go through life, you may need to start new fires if the old fire begins to fade.

I have observed that most very successful people have three common characteristics. First, they have above-average intelligence. Second, they have a strong drive to acquire knowledge throughout their lives. Third, and most importantly, they have a strong fire in their bellies.

**You should remember that you probably will *not* realize your full potential unless there is always a strong fire in your belly. Find ways to keep that flame burning!**

**IT'S BREEDING AND IT'S TRAINING** and it's something unknown that drives you and carries you home. — *"Run for the Roses," Dan Fogelberg*

## A WARNING

In 1969, Laurence J. Peter published *The Peter Principle: Why Things Always Go Wrong*. The central theme of the book is captured in a single quote: “In a hierarchy, every employee tends to rise to his [or her] level of incompetence.” While I believe this is a bit of an exaggeration, I know it happens because it happened to me. (My area of weakness, recall, was leadership. See the “Introduction.”)

I believe high-potential employees are the ones who are most likely to find themselves promoted to a level where they are ill prepared for the new challenges they will face. Employees who move up rapidly but who have not prepared themselves for their next promotion are likely to someday find themselves “in over their heads.”

By committing at least one hour a day to self-study, as I have strongly encouraged in this booklet, you will probably soon find yourself on the “fast track.” I have two suggestions that should help to avoid the trap described above.

1. Always maintain diversity in your self-study program. For example, don't spend the first three years studying only financial analysis.
2. Don't be “pushy” about seeking a promotion. Just handle your current job as well as possible and learn as much as you can from on-the-job experiences. Also, apply self-study knowledge to your current assignment. Be patient, because you can never be too prepared for the next promotion. When you do get a promotion, reread the applicable parts of Michael Watkins's *The First 90 Days*.

## SOME OF MY FAVORITE SAYINGS

It's important to know what's most important.

Every day is an opportunity to

- acquire additional knowledge,
- get some important things done,
- brighten someone's day.

The sooner you *learn* about leadership, the sooner you will begin to *think* like a leader. The sooner you *think* like a leader, the sooner you will *become* a leader.

Never underestimate anyone — especially yourself.

Winners have all the advantages. Learn how to become a winner and how to make your organization a winner.

Always be prepared for opportunity.

Progress cannot be achieved without change. Risk is always associated with change.

Thus, progress requires risk-taking. Management's job is to

- A. determine what changes are necessary to achieve progress, and
- B. manage and minimize the risks associated with the changes.

Stupidity is continuing to do the same thing while hoping things will get better.

Self-confidence backed up by knowledge and experience is a virtue; otherwise, it is simply arrogance.

Mankind advances when, in aggregate, more people are net contributors than net takers.

You never know how far your good deeds will travel.

Nothing worthwhile is easy. — *Edwin Moore Stone (my grandfather)*

Success is a lousy teacher. — *Bill Gates*

Self-education is, I firmly believe, the only kind of education there is. — *Isaac Asimov*

When I read a book that cost \$20 and I get one good idea, I've gotten one of the greatest bargains of all time. — *Tom Peters*

The man who doesn't read good books has no advantage over the man who can't read them.  
— *Mark Twain*

It's how we perceive ourselves to be that determines who we are. — *John Maxwell*

The difference between where you are today and where you will be five years from now will be found in the quality of books you've read. — *Jim Rohn*

If you believe you can, or believe you can't — either way, you're right. — *Henry Ford*

Whatever be the qualifications of your tutors, your improvement must chiefly depend on yourselves. They cannot think or labor for you, they can only put you in the best way of thinking and laboring for yourselves. If therefore you get knowledge, you must acquire it by your own industry.  
— *Joseph Priestly (dedication of New College, London, 1794)*

Problems are only opportunities in working clothes. — *Henry J. Kaiser*

Most of us are teabags; we don't know how strong we are until we're in the hot water.  
— *Eleanor Roosevelt*

Everybody wants to save the earth; nobody wants to help Mom do the dishes. — *P.J. O'Rourke*

If your boss could take five people into battle with him, you want to be one of those five people. If you are, your career will take care of itself. — *John J. Koraleski, former CEO Union Pacific*

The best dividends on the labor invested have invariably come from seeking more knowledge rather than more [mechanical] power. — *Wilbur and Orville Wright*

## CONCLUDING THOUGHTS

It's worth a few minutes to reflect on what you have just read. It has been a lot to absorb and digest. You may feel overwhelmed by the breadth of knowledge I have suggested you pursue. Don't worry about the length of the journey; just start it! I believe you will soon look forward to the time you set aside for reading and study. As your knowledge begins to build over a variety of subjects, you will become more confident that you are moving forward and ahead of your peers. In two to four years, your breadth of knowledge will begin to be apparent to your superiors.

If at any time you decide you want to get an MBA, your self-study program will give you a head start and an advantage.

I may be biased, but I believe engineers are very special. They are taught to be analytical, thorough, thoughtful, inquisitive, and creative problem solvers, and all are trained in a unique specialty. Furthermore, obtaining an engineering degree is not easy. It requires maturity, hard work, discipline, and determination.

Now, imagine if you could take all of these qualities that make engineers so special and add a broader range of knowledge as discussed in this booklet. Then you would have something extraordinarily special! This would be the equivalent of an engineer with an MBA and more, *which is a very unique and valuable set of skills.*

Some engineers go on to get their MBAs, but practically no MBA graduates go on to get engineering degrees. Ten years of a serious self-study program will give you more business and leadership knowledge than most MBA graduates have.

In 2004, Spencer Stuart, an executive search firm, published a comprehensive study of S&P500 CEOs. The most common undergraduate degrees earned by these CEOs were as follows:

Engineering	21%
Business Administration	15%
Economics	11%
Accounting	6%

Thirty-eight percent of the CEOs also obtained MBAs. Since an MBA covers business administration, economics, accounting, and a number of other subjects, we might reasonably conclude that an undergraduate degree in engineering plus an MBA is a powerful combination.



**Ursula Burns**  
Former Chair of the Board and CEO of Xerox Corp.

*"Problem solving, discipline, turning complexity into simplicity, managing by fact, valuing contributions from others—all these are attributes of successful engineers and, I believe, successful leaders" (Green, Hymowitz & Colby, GM CEO Barra Adds to Ranks of Science-Minded Female CEOs, Bloomberg, Dec. 11, 2013).*

Now, let's engage in a little mind exercise. Imagine, after six years of self-study, you know more about business than 90% of your peers. You also know more about economics, finance, and accounting than 90% of your peers. As an extra, you have better leadership skills than 90% of your peers. Now think about this: How many of your peers would have more *combined* knowledge in business, economics, finance, accounting, and leadership than you do? Not many! Do you think this will give you a significant competitive advantage? You bet it will!

In the United States, 4.4 MBA degrees are granted for every engineering degree (Navarro, *What the Best MBAs Know*, 3). Engineers who have MBAs, or the equivalent through self-study, are relatively rare in comparison to the number of MBAs floating around. Who is more likely to rise to the upper levels of an organization: MBA graduates or engineering graduates with MBAs (or equivalent)? I think the answer is obvious!



*The words below the University of Tennessee's Torchbearer photo on the first page capture the two main themes of this booklet:*

- *Victory is in your hands.*
- *Help others.*

*This is the essence of the Volunteer Spirit!*

**YOU ARE NOT HERE** merely to make a living. You are here in order to enable the world to live more amply, with greater vision, and with a finer spirit of hope and achievement.

You are here to enrich the world, and you impoverish yourself if you forget this errand!

— *Woodrow Wilson*

## **RUN FOR THE ROSES**

Imagine you are the young colt in the video link below and listen carefully to the lyrics. When you receive your engineering degree, the starting gate will open and the race will begin. Having read this booklet, you now know what's required to win while your competitors won't have a clue. Your next destination will be the winner's circle with a blanket of red roses draped over your shoulders. Enjoy your well-deserved accolades! Then, in true Volunteer form, find ways to "pay your success forward" to enrich your life and others' even more. <https://www.youtube.com/watch?v=61cceAXnC6w> (Note: You may have to put up with an ad before you get to the video.)



## READING SUGGESTIONS

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Several students have asked for guidance regarding which of the following books should be given priority. To provide some guidance, I have separated the books into three categories.

<u>Category</u>	<u>Time Frame to Read</u>
(1)	First 3 years after graduation
(2)	Years 4–7 after graduation
(3)	Years 8–10 after graduation

I do not mean to suggest that category 3 books are less important than those in category 1. Rather, the earlier books are more introductory in nature and provide a good foundation for the more in-depth books in categories 2 and 3. Also, you are likely to get more benefit from category 3 books after you have more life and work experiences. The book reviews I have provided should also help you decide your reading priorities.

The contents of these books offer knowledge that can make you a very valuable person. So, it is important that you grasp and retain the "gems of knowledge" in each book. My recommendation is to use a highlighter to capture the sentences and paragraphs that are especially meaningful for you. Then, review your highlighted notes every six months for a couple of years. This repetition is required for your brain to retain these important parts of the book.

In the introductory material of Dale Carnegie's book, *How to Win Friends and Influence People*, he has a chapter titled "Nine Suggestions on How to Get the Most Out of This Book" in which he writes, "I once spent almost two years writing a book on public speaking and yet I found I had to keep going back over it from time to time in order to remember what I had written in my own book. The rapidity with which we forget is astonishing" (xxiv).

Make it your goal to extract the maximum value from each book you read!

**Note:** I am always looking for great books to add to this list. If you have any suggestions, please forward the title, author, and a brief review to [jms0814@yahoo.com](mailto:jms0814@yahoo.com), and I will carefully review the book. Your suggestions may have a major impact on a future UT engineering graduate.

Having read this booklet, you are eligible to receive two free books from the list below:

- *How to Win Friends and Influence People*
- *How Successful People Lead*
- *Conversationally Speaking*
- *Emotional Intelligence 2.0*
- *The Truth About Leadership*
- *Executive Presence*

You may pick up your two books at the Engineering Professional Practice office, 161 Zeanah Engineering Complex.

# Bill Gates Says Reading 50 Books a Year Gives Him a Huge Advantage

Drake Baer, Tech Insider  
Jan. 8, 2016, 3:01 PM



**Bill Gates**  
Microsoft Founder, Bill and Melinda  
Gates Foundation Founder and Trustee

## Six Favorite Books — 2015

*Thing Explainer: Complicated Stuff in Simple Words*, by Randall Monroe

*Mindset*, by Carol S. Dweck

*The Road to Character*, by David Brooks

*Being Nixon*, by Evan Thomas

*Eradication: Ridding the World of Diseases Forever?*, by Nancy Leys Stepan

*Sustainable Materials with Both Eyes Open*, by Julian M. Allwood and Jonathan M. Cullen

Bill Gates says that he reads about 50 books a year.

Why would the world's richest man — worth an estimated \$78 billion — spend so much time leafing through pages?

Most of what he reads is nonfiction that explains something about how the world works. His favorites from 2015 dug into how buildings are built, how children succeed, and how diseases are eradicated.

In a recent interview with Katherine Rosman at the *New York Times*, Gates explained that reading has always been one of the “chief ways” that he learns.

“These days, I also get to visit interesting places, meet with scientist, and watch a lot of lectures online,” Gates explained. “But reading is still the main way that I both learn new things and test my understanding.”

Sometimes, a book will help him see familiar things in a new light. “For example, this year I enjoyed Richard

Dawkins's *The Magic of Reality*, which explains various scientific ideas and is aimed at teenagers,” Gates writes. “Although I already understood all the concepts, Dawkins helped me think about the topics in new ways. If you can't explain something simply, you don't really understand it.”

It's fascinating that Gates, one of the greatest technologists in history, relies on one of the oldest information technologies — the written word — to further his understanding of the world. Not even on an e-reader — the Bill and Melinda Gates Foundation head reads print.

As the American philosopher Mortimer Adler noted in “How to Read a Book,” books are the best teachers available for people who aren't in school. And Gates, the world richest man (and perhaps one of the most studious), uses reading to add to his understanding of the world.

“This is one of the things I love about reading,” Gates said. “Each book opens up new avenues of knowledge to explore.”

## **BOOKS FOR YOUR CONSIDERATION**

### **Financial Analysis & Economics**

- Friedlob, George T., and Franklin J. Plewa Jr. *Understanding Return on Investment*. (1)
- Friedman, Milton, and Rose Friedman. *Free to Choose*. (3)
- Groppelli, A. A. *Barron's – Finance*. (3)
- [Housel, Morgan](#). *The Psychology of Money* (1)
- Plewa, Franklin J., Jr. and George T. Friedlob. *Understanding Income Statements*. (2)
- Sepulveda, Jose A., William E. Souder, and Byron S. Gottfried. *Schaum's Outlines – Engineering Economics*. (1)
- Sullivan, William G., Elin M. Wicks, and C. Patrick Koelling. *Engineering Economy*. (2)
- Tracey, John A. *How to Read a Financial Report*. (2)

### **Leadership/Psychology/People Skills**

- [Asher, Donald](#). *Who Gets Promoted, Who Doesn't, and Why*. (1)
- Bennis, Warren, and Burt Nanus. *Leaders: Strategies for Taking Charge*. (3)
- [Bradberry, Travis, and Jean Greaves](#). *Emotional Intelligence 2.0*. (1)
- Brooks, David. *The Social Animal*. (3)
- [Cabane, Olivia Fox](#). *The Charisma Myth*. (1)
- Cain, Gordon. *Everybody Wins*. (3)
- Carnegie, Dale. *How to Win Friends and Influence People*. (1)
- Charan, Ram. *What the CEO Wants You to Know*. (3)
- Cockerell, Lee. *Creating Magic*. (1)
- Cohen, William A. *Drucker on Leadership*. (3)
- Collins, Jim. *Good to Great*. (3)
- Covey, Steven R. *The 7 Habits of Highly Effective People*. (1)
- Epstein, David. *Range: Why Generalists Triumph in a Specialized World*. (1)
- Freiberg, Kevin, and Jackie Freiberg. *Nuts! Southwest Airlines' Crazy Recipe for Business and Personal Success*. (3)
- Garner, Alan. *Conversationally Speaking*. (1)
- Gladwell, Malcolm. *Outliers*. (3)
- Glaser, Judith E. *Conversational Intelligence*. (1)
- [Goleman, Daniel](#). *Emotional Intelligence*. (2)
- Grove, Andrew S. *Only the Paranoid Survive*. (3)
- [Hewlett, Sylvia Ann](#). *Executive Presence*. (1)
- Iverson, Ken. *Plain Talk*. (3)

- Kelley, Robert E. *How to Be a Star at Work*. (3)
- [Kouzes, James M., and Barry Z. Posner](#). *The Leadership Challenge*. (1)
- [Kouzes, James M., and Barry Z. Posner](#). *The Truth About Leadership*. (1)
- Lawrence, Paul, and Nitin Nohria. *Driven: How Human Nature Shapes Our Choices*. (2)
- Lehrer, Jonah. *How We Decide*. (1)
- Lencioni, Patrick. *The Five Dysfunctions of a Team*. (3)
- Lynn, Adele B. *The EQ Difference: A Powerful Plan for Putting Emotional Intelligence to Work*. (2)
- Maxwell, John C. *How Successful People Grow*. (2)
- Maxwell, John C. *How Successful People Lead*. (2)
- Rohn, Jim. *The Five Major Pieces to the Life Puzzle*. (1)
- Tedlow, Richard S. *Andy Grove — The Life and Times of an American Business Icon*. (3)
- Toogood, Granville N. *The Articulate Executive*. (1)
- Warner, Chris, and Don Schmincke. *High Altitude Leadership*. (3)
- Watkins, Michael. *The First 90 Days*. (2)
- Welch, Jack. *Straight from the Gut*. (2)
- [Welch, Jack](#). *Winning*. (2)
- Wiersma, Bill. *The Power of Professionalism*. (1)

### **General Business**

- Appleby, Robert C. *Modern Business Administration*. (3)
- [Cialdini, Robert B.](#) *Influence: The Psychology of Persuasion*. (2)
- Covert, Jack, and Todd Sattersten. *The 100 Best Business Books of All Time*. (2)
- [Drucker, Peter F.](#) *The Daily Drucker*. (1)
- Drucker, Peter F. *The Essential Drucker*. (3)
- Drucker, Peter F. *The Practice of Management*. (3)
- Emerson, Robert W. *Barron's Business Law*. (3)
- [Fisher, Roger, and William Ury](#). *Getting to Yes*. (1)
- Hampton, John J. (ed.). *AMA Management Handbook*. (1–3)
- Mackay, Harvey. *Beware the Naked Man Who Offers You His Shirt*. (2)
- [Magretta, Joan](#). *Understanding Michael Porter*. (3)
- [Munger, Charles T.](#) *Poor Charlie's Almanack*. (3)
- [Navarro, Joe](#). *What Every BODY Is Saying*. (1)
- Navarro, Peter (ed.). *What the Best MBAs Know*. (1)
- Porter, Michael E. *Competitive Strategy*. (3)

Porter, Michael E. *On Competition*. (3)

Sandhusen, Richard L. *Barron's Marketing*. (3)

[Surowiecki, James](#). *The Wisdom of Crowds*. (1)

Yergin, Daniel. *The Prize: The Epic Quest for Oil, Money & Power*. (2)

## SOME COMMENTS ON THESE BOOKS

### Financial Analysis & Economics

► ***Understanding Return on Investment*** — George T. Friedlob and Franklin J. Plewa, Jr.

I believe this is one of the most important measures of business performance. A thorough understanding of ROI will serve you well throughout your life.

In Chapter 2, you will learn about “ROI and the DuPont System of Financial Analysis.” Review and study this chapter until you have it “down cold.”

► ***The Psychology of Money*** — Morgan Housel

This is a “must read” for every young professional. It clearly describes what is required to steadily achieve financial security over time. His investment advice is the same as the advice Warren Buffett has given his family members who will inherit a portion of his wealth. I strongly encourage you to read this book soon after you graduate.

► ***Schaum’s Outlines – Engineering Economics*** — Jose A. Sepulveda, William E. Souder, and Byron S. Gottfried

This book provides lots of sample problems with answers. When going through this book, get out your pen, paper, and calculator and work through every problem. That process will build your confidence and knowledge.

► ***Engineering Economy*** — William G. Sullivan, Elin M. Wicks, and C. Patrick Koelling

This book, first published in 1997, provides problems at the end of each chapter as well as answers to selected problems in Appendix H. Of all the books that I have recommended, this is the one that will require the most work and study. Yet, when you have mastered this subject, you will be far ahead of most of your peers. **This is knowledge you need to acquire early in your career.** Spend as much time as necessary to master this subject. Your goal should be to be more knowledgeable in this area than 98% of all other engineers.

The authors make this point very clearly: “An engineer who is unprepared to excel at engineering economy is not properly equipped for his or her job.”

### Leadership/Psychology/People Skills

► ***Who Gets Promoted, Who Doesn’t, and Why*** — Donald Asher

The author is a professional career consultant, and, as might be expected, he advocates a very aggressive approach to managing one’s career. Personally, I would not recommend quite such an aggressive approach because it is likely to lead to a situation where you will find yourself “out over

your skis.” That is, you find yourself in a position for which you are not fully prepared. The author addresses this specific issue on page 48:

What’s different about fast-track people is that they *anticipate* the needs of their organizations. They are true lifelong learners, acquiring new skills on an ongoing basis with a strategy in mind: to have the skills they need for their next assignment before that assignment is even available to them. . . . The days of leaving learning at the edge of the university campus are over.

The bottom line is that it is your choice as to how aggressively you manage your career. But, by reading this book, you will become aware of the choices you have. And, the advice regarding the things *not* to do make the book a worthwhile read.

► ***Emotional Intelligence 2.0*** — Travis Bradberry and Jean Greaves

While Daniel Goleman’s book gives you a broad and useful understanding of emotional intelligence, this book is more of a “how to” handbook to help you develop and improve your emotional intelligence skills. At the back of the book, a password is provided that will allow you to take an “Emotional Intelligence Appraisal” online. You can also repeat the test at a later time to measure your progress.

These authors stress the importance of emotional intelligence:

People with the highest levels of intelligence (IQ) outperformed those with average IQs just 20 percent of the time while people with average IQs outperformed those with high IQs 70 percent of the time. . . . Years of research and countless studies pointed to emotional intelligence (EQ) as the critical factor. (7)

► ***The Social Animal*** — David Brooks

I suggest you read this book after having read a few books related to emotional intelligence. That background will help you better appreciate the human insights provided in this book.

David Brooks tells the life story of a fictional couple (Erica and Howard) and weaves in throughout their story the many new discoveries made over the past 30 years related to psychology and the workings of the brain. For example, the author states, “If you have a successful marriage, it doesn’t matter how many professional setbacks you endure, you will be reasonably happy” (147).

This very informative and enjoyable book is written by a well-known *New York Times* columnist.

► ***The Charisma Myth*** — Olivia Fox Cabane

I had serious doubt that charisma could be learned, but I was curious enough to purchase and read the book. My doubts have been erased!

As discussed in Cabane’s book, the three building blocks of charisma are presence, power, and warmth. The author explains why these are important: the critical components of each building block,

how to utilize mind exercises to overcome mental obstacles, and the development of the skills to build strength in the three areas.

Robert B. Cialdini, author of *Influence*, says, “Cabane has done us a big favor. She’s woven solid science and engaging narrative into an instructive treatment of the role of charisma in leadership — a topic that (until now) we only poorly understood.”

► ***Everybody Wins*** — Gordon Cain

In my opinion, Gordon Cain is an ideal role model for every chemical engineer. In this book, you will see how he was able to purchase poorly managed chemical businesses, turn them around, and then sell them for a handsome profit. You will also see how he made sure that everybody would win if the business plan was a success.

He describes why so many U.S. businesses are poorly managed:

I was convinced that most large U.S. businesses were overstaffed and over managed, that they were too concerned with procedure and not enough with the product and the customer, that they were too concerned with process rather than the product. (301)

You might find interesting how, in 1929, he decided to pursue a chemical engineering degree:

I went to the library, as I still do when I have a problem. My research showed that of all the technically related professions, chemical engineers received the highest starting salaries. I decided to become a chemical engineer without having more than a vague idea of what one did. (49–50)

Gordon Cain and his wife were very generous with the considerable wealth he created. He describes his philosophy regarding charity this way:

Rather than donating money to alleviate problems, it is better to try to prevent the problems. Consequently, a substantial part of our funds is going to education at all levels, from trying to improve secondary education at all levels to creating college scholarships. (263)

So many people, now and in the future, will benefit because of Gordon Cain.

► ***How to Win Friends and Influence People*** — Dale Carnegie

Although this book was first published in 1937, its wisdom and advice have not lost any relevance. I recommend that you reread this book every five to ten years.

From page xvi:

Even in such technical lines as engineering, about 15 percent of one’s financial success is due to one’s technical knowledge and about 85 percent is due to skill in human engineering — to personality and the ability to lead people.



So the only way on earth to influence other people is to talk about what they want and show them how to get it. (34)

This book is filled with wonderful advice!

► ***What the CEO Wants You to Know*** — Ram Charan

This small book is a quick read. It discusses the importance of developing both financial analysis and leadership skills:

CEOs who deliver results have mastered both the business side and the people side. Unless the CEO masters both parts of the leadership equation, the company cannot continue to deliver results and succeed. (114)

Try to read it within the first six months after graduation.

► ***Creating Magic*** — Lee Cockerell

The author grew up on a farm in Oklahoma and joined the Army after dropping out of college. Despite this slow start, he rose to become the Executive Vice President, Operations at Walt Disney World.

On page 8, he talks about a major promotion and the key factor that led to that promotion. “I’m sure there were many reasons for that promotion, and one of them was surely my passion for leadership excellence. Judson [his supervisor] knew that I had been studying the subject for many years and had implemented key leadership principles during my time with the company.”

You will learn in detail most of the key concepts of leadership as practiced in the real world by this great leader.

► ***Drucker on Leadership*** — William Cohen

Peter Drucker is known as the “Father of Modern Management.” William Cohen was the first graduate of Drucker’s executive Ph.D. program and has known and learned from Drucker for many years.

Academic thinking about leadership evolved and developed dramatically over Drucker’s career. For example, in 1954, Drucker wrote, “Leadership is of the utmost importance. Indeed there is no substitute for it.” And a few sentences later, he wrote, “Leadership cannot be taught or learned.” Then, in 1996, 42 years later, he wrote, “Leadership must be learned and can be learned.”

Drucker believed, writes Cohen, that the failure rate of top executive leaders could be substantially reduced by

the individual leader’s acceptance of responsibility for self-development and preparation before promotion. **This could be accomplished by accepting responsibility for and managing one’s own preparation for top management, mastering a separate**

**discipline outside a primary profession, reading extensively in all fields, and thinking, discussing, and writing about topics of interest and importance. (176–77)**

By reading this book, you will learn about the business genius of Peter Drucker and gain valuable insights about leadership.

► ***Range: Why Generalists Triumph in a Specialized World*** — David Epstein

People with a broad range of knowledge and life experiences are much more valuable than those with a narrow range of specialized knowledge and a limited interest in other areas. They are more creative and are able to see connections that others miss. On page 290, the author states, “Research on creators in domains from technological innovation to comic books shows that a diverse group of specialists cannot fully replace the contributions of broad individuals.”

At times, the author will use a long story to illustrate a single point. If you are impatient or not interested in the story, move ahead to the next chapter.

► ***Nuts! Southwest Airlines’ Crazy Recipe for Business and Personal Success*** — Kevin and Jackie Freiberg

► ***Plain Talk*** — Ken Iverson

Warren Buffett has said, “When you pair up good management with a bad business, the bad business usually wins.” That is, even the best managers cannot turn a fundamentally bad business into a good business.

From my perspective, a bad business has three fundamental characteristics. It is

- Capital intensive
- Energy intensive
- People intensive

Any business that has two or more of these characteristics is usually a bad business. Most commodity chemical businesses, steel, and aluminum, have two (capital and energy intensive); the automobile industry also has two (capital and people intensive). Airlines have all three.

These two books tell the story of two exceptional leaders (Ken Iverson of Nucor Steel and Herb Kelleher of Southwest Airlines) who proved Buffett wrong. When you read these two books, you will see how these leaders turned bad businesses into exceptional, industry-leading businesses. They achieved their remarkable success through their ability to motivate all the employees in the organization and get them to consistently work together toward a common goal. If these leadership skills can work so effectively in businesses with bad fundamentals, think what the same skills could accomplish in businesses with good ones!

Iverson and Kelleher are examples of the power and effectiveness of excellent leadership.

► ***Conversationally Speaking*** — Alan Garner

We interact and communicate with others through the words we speak, the tone of our voices, and our body language. Communication is, in essence, “ground zero” for practicing emotional intelligence.

This book provides many examples of thoughtful, considerate, and positive conversations and makes contrasts with conversations that evolve into a negative, downward spiral.

You will learn how to be comfortable starting a conversation with a stranger and how to manage that conversation so that the other person will feel good about having met and spoken with you. No matter where you are on the scale from introvert to extrovert, you will gain valuable insights by reading this book.

► ***Outliers*** — Malcolm Gladwell

A quote from *The Economist* best summarizes the essence of this book:

*Outliers* is a compelling read with an important message: by understanding better what makes people successful, we should be able to produce more successful (and happy) people.

► ***Conversational Intelligence: How Great Leaders Build Trust and Get Extraordinary Results***

— Judith E. Glaser

Thoughtful and skilled conversations build relationships and trust, which lead to mutually rewarding results. On page 83, the author states, “‘Feel good’ conversations trigger higher levels of dopamine, oxytocin, endorphins, and other chemicals that give us a sense of well-being.” And on page xiii, she emphasizes, “**Conversational Intelligence is what separates those who are successful from those who are not — in business, in relationships, and even in marriages.**”

► ***Emotional Intelligence*** — Daniel Goleman

This is a must-read and a must-reread book. The knowledge you acquire will put you miles ahead of your peers in understanding and applying emotional intelligence. While reading this book, I jotted down two pages of interesting passages:

There is, inevitably, a cost to the bottom line from low levels of emotional intelligence on the job. . . . A new competitive reality is putting emotional intelligence at a premium in the workplace and in the marketplace. (148–49)

**These special abilities allow one to shape an encounter, to mobilize and inspire others, to thrive in intimate relationships, to persuade and influence, to put others at ease.** (113)

Use this book to establish your core competency in emotional intelligence. Other books can then support and build on this core competency.

► ***Only the Paranoid Survive*** — Andrew S. Grove

In business, as in sports, once a team becomes a winner, it will have many advantages. Winners, however, are vulnerable to a slow-growing cancer called complacency. As complacency sets in and spreads, all the advantages associated with being a winner slowly decline in a downward spiral.

Intel is one of the most successful microprocessor company in the world today because Andy Grove and his team survived a dramatic change early in their corporate lives. This experience caused them to always be sensitive to and wary of disruptive change that might be just around the corner. Paranoia is the best antidote for complacency.

Most of the book is devoted to detecting, analyzing, and reacting to strategic inflection points. In Chapter 10, “Career Inflection Points,” Grove states:

**I have long held that each person, whether he is an employee or self-employed, is like an individual business. Your career is literally your business, and you are its CEO.** Just like the CEO of a large corporation, you must respond to market forces, head off competitors and be alert to the possibility that what you are doing can be done in a different way. It is your responsibility to protect your career from harm and to position yourself to benefit from changes in the operating environment. (188–89)

Andy Grove received his Ph.D. in chemical engineering from the University of California at Berkeley. He is another wonderful role model for all chemical engineers.

► ***Executive Presence*** — Sylvia Ann Hewlett

The first two paragraphs of the inside flap capture the essence and value of this great book:

You might have the qualifications to be considered for your dream job, but you won’t get far unless you can signal that you’re “leadership material” and that you “have what it takes.” Professionals are judged on presence as well as on performance.

Using a wealth of hard data — including a new nationwide survey of dozens of focus groups — Hewlett reveals EP to be a dynamic mix of three things: how you act (gravitas), how you speak (communication), and how you look (appearance). She also draws on in-depth interviews with a wide selection of admired leaders to reveal how they embody and deploy key elements of EP.

I also encourage you to view a lecture the author delivered to a group of Google employees in 2014. Simply Google: Sylvia Ann Hewlett, Executive Presence, YouTube. I think her story will inspire you and that you will benefit greatly from her advice and teachings.

► ***How to Be a Star at Work*** — Robert E. Kelley

This book is most useful for the early years of your career — before you have a number of people reporting to you.

The book is based on ten years of exhaustive research by the author and his associates. It is not a theoretical discussion but rather a series of clear examples of what works, what doesn't, and why. For example, the author states:

They [stars] are the first among their peers to take advantage of continuing education programs and performance improvement seminars, even suggesting programs that managers don't know about. (162)

And in Chapter 10, the author describes where and how you will first have opportunities to demonstrate your leadership potential. I think he makes an especially good point in writing, "Leadership is most often about the mundane everyday job of creating momentum to get things done" (168).

► ***The Leadership Challenge*** — James M. Kouzes and Barry Z. Posner

The authors have spent most of their adult lives studying, teaching, and writing books about leadership. I think this is one of the best leadership books I have read. Kouzes and Posner have collected data from leadership surveys from all over the world and over long periods of time. What they tell you about leadership is based on data, not on abstract, subjective thought processes. As an engineer, I find that attractive!

Here's one quotation from this book that I found especially powerful:

One midcareer executive told us about an address he still remembers by General Colin Powell, given at the Naval Academy in 1992: "He told the assembled brigade of midshipmen that one of the tenets of a good leader is to never stop learning."

► ***The Truth about Leadership*** — James M. Kouzes and Barry Z. Posner

This is an excellent book — especially Chapter 9, "The Best Leaders Are the Best Learners." Here are some excerpts from the book to trigger your interest:

The four most frequently cited characteristics (listed in order) of admired leaders are:

- Honest
- Forward-looking
- Inspiring
- Competent (17)

The classic profile organizations look for in hiring a senior executive (relevant experience and outstanding IQ) is much more a predictor of failure than success unless the relevant emotional intelligence competencies are also present. *In fact, serious weaknesses in the domain of emotional intelligence predict failure at senior levels with amazing accuracy.* (64, quoting Cherniss and Goleman, *The Emotionally Intelligent Workplace*, 189)

► ***Driven: How Human Nature Shapes Our Choices*** — Paul Lawrence and Nitin Nohria

This book provides wonderful insights into the four drives behind human choices:

- The drive to acquire
- The drive to bond
- The drive to learn
- The drive to defend

These basic drives have become hardwired in our brains after thousands of generations of evolution. You will probably be surprised to learn of the evolutionary force that underlies these drives. Knowledge related to these drives will help you (a) understand yourself better and (b) better understand others.

► ***How We Decide*** — Jonah Lehrer

This is another book that explains the interesting workings of the human brain, specifically as it relates to our decision-making process. Summarized below are some quotes that I hope will motivate you to read the book.

Our best decisions are a finely tuned blend of both feeling and reason — and the precise mix depends on the situation. (Inside flap)

Unless you experience the unpleasant symptoms of being wrong, your brain will never revise its models. Before your neurons can succeed, they must repeatedly fail. There are no shortcuts for this painstaking process. (54)

The problem is that the rational brain isn't good at disregarding facts (anchoring), even when it knows the facts are useless. . . . The fragility of the prefrontal cortex means that we all have to be extremely vigilant about not paying attention to unnecessary information. (157)

As it happens, some of our most important decisions are about how we treat other people. The human being is a social animal, endowed with a brain that shapes social behavior. (166)

► ***How Successful People Lead*** — John C. Maxwell

Developing outstanding leadership skills involves a long, deliberate learning process. No one expects a twenty-five-year-old to have the leadership skills of a seasoned CEO. However, the twenty-five-year-old who demonstrates more leadership potential than his or her peers is the one most likely to be given opportunities that will, in time, lead to higher levels of leadership skills.

John C. Maxwell helps clarify this process as he takes the reader through “The Five Levels of Leadership.” You will see how each successive level requires different, broader, and more demanding leadership skills. This book provides an excellent overview of the long-term development of leadership.

On page 121, the author captures what I believe is the pinnacle of leadership:

Improvement of individual leaders’ lives is the highest goal of leadership development. When you help other people become leaders, you change their lives. You change the way they see the world. You change their capacity. You increase their potential. You change the way they interact with others. **If they become good leaders, you help them improve not only their lives but also the lives of everyone they touch. I believe that is how you change the world for the better.**

► ***The Five Major Pieces to the Life Puzzle*** — Jim Rohn

This is another book I hope you will read soon after you graduate. It will help you gain a clear understanding of the key elements that will lead to a successful life. The following quote captures the essence of this valuable book:

It is our personal philosophy that establishes our individual attitude. It is our attitude that determines both the quantity and quality of our level of activity. That activity produces proportionate results, and the results provide the lifestyle we seek. (Foreword)

► ***Andy Grove: The Life and Times of an American Business Icon***

— Richard S. Tedlow

This book tells Andy Grove’s life story and the vital role he played in Intel’s success. Intel’s success would not have happened if Grove had not taken the initiative to learn management skills. (He earned a Ph.D. in chemical engineering from University of California at Berkeley.)

Soon after Intel was formed, Grove realized that he needed to develop management skills because he knew his technical knowledge alone would not be sufficient to assure that “the trains ran on schedule at Intel”:

At one point he [Grove] put himself on a regimen of [reading] one management book a week. I cannot think of another executive who, in the midst of a schedule that was so packed that some would find it crushing, had the desire and discipline to read so much about management. . . . In the 1970s he read Peter F. Drucker’s *The Practice of*

*Management*. He described it as Drucker's "best book . . . my favorite book," because of its description of the "ideal chief executive." (74)

This book clearly demonstrates why engineers who aspire to higher levels of responsibility must be proactive in learning about management and leadership.

► ***The Articulate Executive*** — Granville N. Toogood

"You never get a second chance to make a good first impression."

Fortunately, in most cases you do get a second chance. But why not make your best effort to make a good first impression?

I hope you will be able to read this book before your first presentation. This book will help you make very effective and professional presentations, which will be a very important skill in setting you apart from other engineers.

On page 163, the author states:

It's a career opportunity for the speaker to demonstrate a command of the subject, to interact with peers, subordinates or supervisors. And it's a chance for the audience to get a feel of what kind of person the speaker is.

Page 196 contains a key statement: "Like it or not, our own words will likely determine our lot in life."

► ***High Altitude Leadership*** — Chris Warner and Don Schmincke

I am not a proponent of mountain climbing; the risk/reward ratio is simply off the charts! However, the authors do make some very interesting and useful connections between the challenges faced on mountains and the challenges faced by leaders.

The authors help you identify and deal with "DUD behavior" (dangerous, unproductive, and dysfunctional behavior), which significantly reduces organizational productivity and prevents or delays achievement of goals.

Another important concept is that individuals, teams, and whole organizations perform at their peak when they are given a very challenging goal *that they wholeheartedly embrace*.

In summary, the book is filled with excellent advice to help leaders understand and deal with the kinds of human conflicts, distractions, and behaviors that can occur in any organization.

► ***The First 90 Days*** — Michael D. Watkins

This book is about what you need to do in the first 90 days after a promotion. Hopefully, you will have read this book before your first promotion. If not, read it as soon as possible after your advancement. Promotions often come with little notice and little time to plan and prepare for your



new assignment. With each promotion, you will need to review this book because, as Watkins explains,

Managers face critical breakpoints as they move from being first time managers to managers of managers and all the way up to enterprise managers. As they move from one level to another, the rules and skill requirements change in significant ways. (76)

Don't ever loan this book to anyone because you will need it throughout your career.

► ***Straight from the Gut*** and ***Winning*** — Jack Welch

Jack Welch is another great role model for chemical engineers. *Straight from the Gut* takes you from his youth through his years at General Electric, and *Winning* covers his years after retirement. Welch created an enormous amount of value for GE shareholders and its employees, and I expect he will continue creating value and helping others past his retirement. You can learn a lot from Jack Welch!

► ***The Power of Professionalism*** — Bill Wiersma

This book will give you new and powerful insights into the meaning of professionalism. You will learn how developing your professionalism will make your career much more rewarding, both financially and personally. You will also learn how developing professionalism within your group or organization will significantly improve the group's performance. On page 287, the author states, "Organizations whose membership views itself as professional outperform, outsmart and outlast organizations that don't." And from page 283, "**A leader who is not a professional is a leader in name only. Leaders who want to make a difference must be professional and must instill professionalism in their people.**"

The author discusses these seven mindsets of trusted professionals:

1. Professionals have a bias for results.
2. Professionals realize (and act like) they're part of something bigger than themselves.
3. Professionals know *things* get better when *they* get better.
4. Professionals have personal standards that often transcend organizational ones.
5. Professionals know that personal integrity is all they have.
6. Professionals aspire to be masters of their emotions, not enslaved by them.
7. Professionals aspire to reveal value in others.

## **General Business**

► ***The 100 Best Business Books of All Time*** — Jack Covert and Todd Sattersten

As you can imagine, picking the 100 best business books of all time would be quite a challenge! But the authors have done a pretty good job. Several of the books are on the recommended reading

list I have provided. However, I thought you should have this book because there may be several others that attract your attention.

► ***The Daily Drucker*** — Peter F. Drucker

This book consists of 366 brief essays (one for each day of the year) that capture the most important concepts of Drucker's lifetime writings. It is a wonderful way to start your mentorship with Peter Drucker. This book is written for business executives two to three levels above you, so don't be surprised if you find some of his essays to be challenging. Embrace the challenge and work hard to gain as much knowledge as you can from his writings. You will soon have more understanding of business and leadership than many of the engineers above you.

I want to thank Logan Potter, BS/ChE '21, for bringing this book to my attention.

► ***The Essential Drucker*** — Peter F. Drucker

This book is a selection from the author's 60 years of work and writing on management. I know of no other management expert held in higher esteem than Peter Drucker. If you could choose only one mentor to teach you about business and management, you could make no better selection than Peter Drucker.

A few of his quotes that support my emphasis on lifelong learning include these:

One of the weaknesses of young, highly educated people today — whether in business, medicine, or government — is that they are satisfied to be versed in one narrow specialty and affect a contempt for the other areas. One need not know in detail what to do with “human relations” as an accountant, or how to promote a new branded product if an engineer. **But one has a responsibility to know at least what these areas are about, why they are around, and what they are trying to do.** (203)

We know very little about self-development. But we do know one thing: people in general, and knowledge workers in particular, grow according to the demands they make on themselves. They grow according to what they consider to be achievement and attainment. If they demand little of themselves, they will remain stunted. If they demand a great deal of themselves, they will grow to giant stature — without any more effort than is expended by the nonachievers. (216)

**One implication of this [the need to learn new things] is that individuals will increasingly have to take responsibility for their own continued learning and re-learning, for their own self-development and for their own careers.** (325)

We neither need nor will we get “polymaths” who are at home in many knowledges; in fact, we will probably become even more specialized. But what we do need — and what will define the educated person in the knowledge society — is the ability to *understand* the various knowledges. What is each one about? What is it trying to do? What are its central

concerns and theories? What major new insights has it produced? What are its important areas of ignorance, its problems, its challenges? (294)

► ***Barron's Business Law*** — Robert W. Emerson

This will probably be the last book you have any interest in reading. But having an overview of business law will help you avoid some very costly mistakes. There are many laws that affect business, including labor law, patent law, contracts, securities laws, antitrust laws, and international laws. You do not need to study this as if you are going to take a bar exam, but a good overview of legal issues will prove very valuable.

► ***Getting to Yes*** — Roger Fisher and William Ury

Roger Fisher taught negotiation at Harvard Law School and was considered a world expert at negotiation and conflict resolution. This book is an opportunity to learn from someone who spent most of his adult life in this important area.

Negotiation skill is one of the most valued and highly prized talents of senior managers. As you rise higher in your organization, you will be increasingly involved in high-level, high-impact negotiations. Your ability to successfully negotiate important transactions will set you apart from others in your organization. I would recommend you review this book before entering any important negotiation.

As an aside, there is one area where I think negotiation is not appropriate. That relates to your compensation. Others may have a different opinion on this matter, but I believe it is awkward, inappropriate, and disrespectful to negotiate for a larger salary increase than your supervisor offers. Any salary increase that is won by negotiation with your supervisor is likely to create more long-term damage than it is worth. That is, you may win a near-term “battle,” but lose the long-term “war.” Instead, you should seek to learn what you could have done better that would have earned you a larger salary increase.

► ***AMA Management Handbook*** — John J. Hampton (ed.)

This handbook, published by the American Management Association, covers most aspects of business. Each section is authored by experts from academia and business (more than 200 in total). Don't try to read straight through this book, but rather read a section a month. I know of no other book that can give you a broader overview of business. It will give you a substantial competitive advantage over your peers.

► ***Understanding Michael Porter*** — Joan Magretta

The author has worked with Michael Porter for almost two decades and was his former editor at *Harvard Business Review*. The book, which is a condensation of Porter's writings on strategy and competition, was written with his full cooperation. This book is a perfect way to quickly learn the valuable lessons Porter has taught at the Harvard Business School for many years.

After carefully reading this book, you will be as knowledgeable about business strategy and competition as many of the senior executives in your organization.

► ***Poor Charlie's Almanack*** — Charles T. Munger

The earlier chapter titled “The Power of Diversified Knowledge” discusses my key “take away” from this book. I believe this book will be of greatest value after you have reached an executive position.

► ***What Every BODY Is Saying*** — Joe Navarro

One very valuable skill for every senior-level executive to possess is the ability to “read” people very quickly and accurately. I was fortunate to have worked for many years for an executive who was very skilled in this area — Donald F. Smith, President of Kaiser Chemicals, and later, President of G.S. Roofing Products. I saw, through him, how important and valuable this unique skill can be in business interactions.

This book is written by an ex-F.B.I. agent who made a science of observing and understanding the body language exhibited by others that gave unique insights in determining whether someone was being truthful or not. You will learn how to quickly read people and gain insights that others might miss. Likewise, you will be able to avoid revealing messages about your feelings and thoughts to others who might be equally skilled in reading body language.

► ***What the Best MBAs Know*** — Peter Navarro (ed.)

This book gives you an overview of the subjects taught at some of the best business schools. You will add another “layer” of business knowledge after reading this book.

► ***The Prize: The Epic Quest for Oil, Money & Power*** — Daniel Yergin

Many chemical businesses are economically sensitive to the price of energy (oil, coal, natural gas). Rapid changes in the price of energy can have significant economic impacts on these businesses. The impact comes during the run-up as well as after the sudden drop in prices. Therefore, it is important for a chemical engineer to be as knowledgeable as possible about the energy business.

This book will give you an in-depth understanding of the history of the oil business. With this background, you will be better prepared to evaluate emerging events in the energy arena and be better prepared to anticipate the future.

## **OTHER RESOURCES**

### ***The Economist***

Most companies today have significant international operations. Another way you can separate yourself from your peers is to be knowledgeable about events happening around the globe, especially in countries where your company has operations. *The Economist*, which is published weekly, is the best way I know to keep up to date on these events. In addition to covering political and economic events, the magazine also has sections on business, finance, science and technology, books, and the arts.

### ***Harvard Business Review***

This magazine contains many articles representing the latest thinking on business-related topics, written by well-respected authors. Reading one article is equivalent to attending a Harvard Business School class lecture. An article is included in the Appendix for your review.

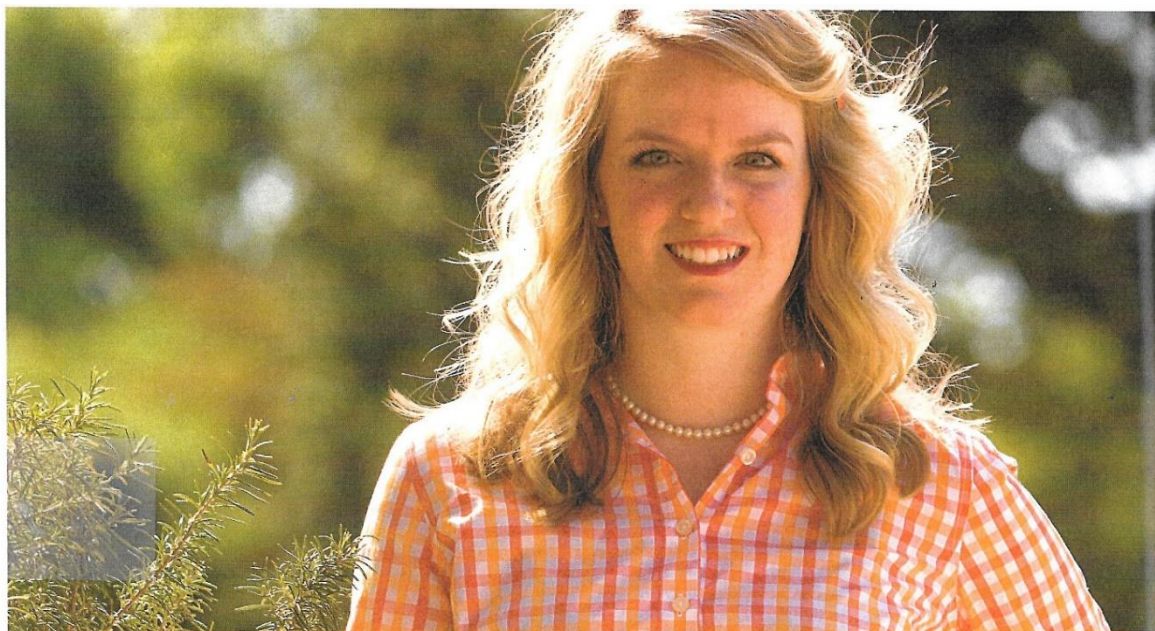
### **Academic Earth**

Academic Earth (<http://academicearth.org>) contains full-course video lectures by respected professors from Berkeley, Columbia, Harvard, MIT, Princeton, Stanford, UCLA, USC, Yale, and many other universities. Some of the many subjects offered include business, economics, history, international relations, political science, philosophy, and writing. It is amazing that such wonderful content is offered free of charge!

### **Ted Talks**

TED Talks (<https://www.ted.com/talks>) provide a wonderful opportunity to view brief presentations by knowledgeable thought leaders. If I am interested in learning more about a subject, I just Google TED Talks and the subject of interest. Topics such as leadership, motivating others, emotional intelligence, people skills, body language, conversation skills, positive first impressions, personal finance management, and many other topics are covered in less than 20 minutes. Over time, one TED Talk a day will add valuable breadth to the scope of your knowledge.

## APPENDIX



"I am so thankful to be a recipient of the John W. Prados Chemical Engineering Co-op scholarship. As required by the scholarship, I am majoring in chemical engineering and minoring in business administration while simultaneously completing a co-op with the Dow Chemical Company. Receiving this scholarship has reduced my financial burdens, allowing me to focus more on the rigorous engineering curriculum and to pursue other leadership and service positions on campus. I have been blessed with the opportunity to serve the University of Tennessee as a Resident Assistant, College of Engineering Ambassador, and Student Alumni Associate. I would not have been able to pursue these activities if I had not received financial support through this scholarship program.

I am incredibly grateful for this scholarship, not only for the monetary relief but also for the inspiration with which it has provided me. Without this scholarship, I would have never thought to pursue a business minor, but I have found that the business minor, in combination with my co-op, has greatly enhanced my education. I feel that I am now a more well-rounded individual with a better understanding of my discipline and the world around me. Following graduation, I plan on continuing my career in the chemical industry, eventually transitioning into management and pursuing an MBA. Overall, becoming a John W. Prados scholar has given me the opportunity to gain leadership skills both on-campus and in the 'real world,' helped me to find my passion in industry, and set me up for a successful career doing what I love."

Rebekah Patton '14

*John W. Prados Scholarship Recipient*

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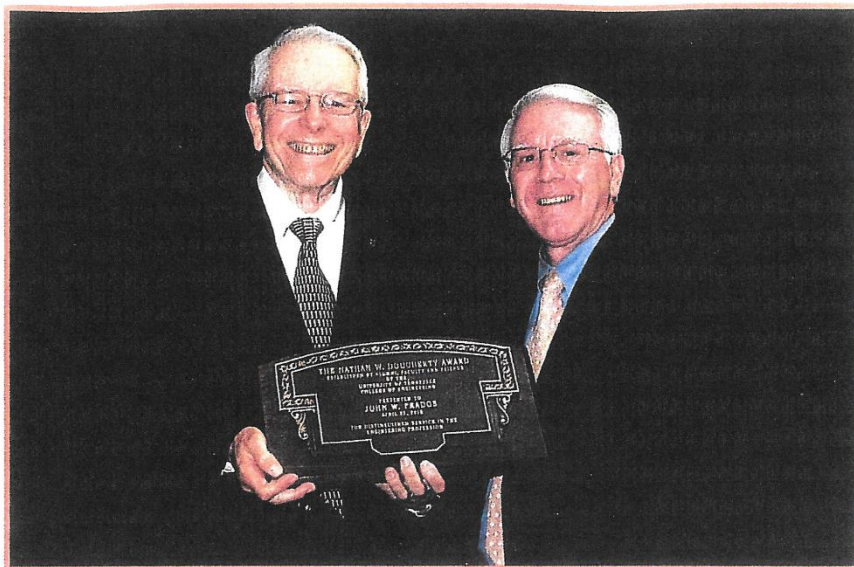
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### 2010 Nathan W. Dougherty Award

Dean Wayne T. Davis presents the Nathan W. Dougherty Award to Dr. John W. Prados at the College of Engineering 2010 Faculty and Staff Awards Dinner

#### Nathan W. Dougherty Award DR. JOHN W. PRADOS

*Professor Emeritus, Department of Chemical and Biomolecular Engineering*

Dr. John W. Prados was named the 2010 Nathan W. Dougherty recipient by the UT Knoxville College of Engineering at the college's Faculty and Staff Awards Dinner on April 22, 2010.

During his distinguished career at UT, which spans more than five decades, Dr. Prados served the University of Tennessee as professor and head in the Department of Chemical Engineering, as Associate Dean of Engineering, Dean of Admissions and Records, Acting Chancellor of both the Knoxville and Martin campuses and Acting Director of Energy Conversion Programs at the UT Space Institute. He also was named Vice President of Academic Affairs of the statewide University of Tennessee system and served in that role from 1973 through 1988. In 1997, he received the coveted Macebearer Award, UT's highest faculty honor.

Noted for his intellectual vigor and national leadership in engineering education, his professional influence has been felt far beyond the state of Tennessee. Dr. Prados is a Fellow of AIChE, ABET and ASEE and is a registered professional engineer (retired) in Tennessee. He received ABET's highest recognition for services to engineering education, the L.E. Grinter Distinguished Service Award, in 1993. He also received the James T. Rogers Award of the Commission on Colleges in 2004, Southern Association of Colleges and Schools, for outstanding leadership in regional accreditation; and the Lifetime Achievement Award in Chemical Engineering Pedagogy from the ASEE Chemical Engineering Division in 2007. He served at the National Science Foundation (NSF) from 1994-1997 as Senior Education Associate in the Engineering Directorate. Dr. Prados has also been a consultant to

industry, government and more than 30 universities and state education agencies in the United States and abroad.

In 2009, Dr. Prados received the Benjamin Garver Lamme Award from ASEE. Established in 1928, the honor recognizes excellence in teaching, contributions to research and technical literature and achievements that advance the profession of engineering college administration. Prados was recognized for 50 years of combined service to the University of Tennessee, ASEE, ABET, NSF and to the nation and the world for his leadership in engineering education reform and innovation.

Dr. Prados earned his B.S. in chemical engineering at the University of Mississippi and his M.S. and Ph.D. degrees with majors in chemical engineering at the University of Tennessee.

The Nathan W. Dougherty award was established by the College of Engineering in 1957 to pay tribute to Nathan Washington Dougherty, dean of the engineering college from 1940-56. The prestigious recognition honors engineers whose accomplishments have enhanced the profession and alumni whose activities have brought acclaim to the university.

Dr. Bamin Khomami, Armour T. Granger and Alvin and Sally Beaman Professor and head of the Department of Chemical and Biomolecular Engineering, announced the establishment of the John W. Prados Professorship that evening. The professorship was created by Malcolm Colditz and augmented by J. Michael Stone, both of whom are former students of Dr. Prados.

[News](#) > News Article

## Commencement Address by Ellen Kullman, Chair of the Board and CEO, DuPont

May 23, 2011

President Gast, distinguished guests, graduates, families and friends:

Let me begin by offering my congratulations to you, the graduates, on your accomplishment and success. Congratulations also to your parents and families. As a mother with a daughter in college and two sons who will graduate from high school next year, I fully appreciate how the college journey can be a family affair—from that first campus visit to the cap and gown you wear today. I hope this has been a wonderful time for all involved.

When Asa Packer founded Lehigh in 1865, the company I lead was already more than 60 years old. DuPont will be 209 years old in July.

We no longer make gunpowder along the banks of Delaware's Brandywine River as we did in 1802. We don't even make nylon anymore. Today we are one of the world's largest producers of seeds for agriculture. The next solar panel you pass by could have up to eight different DuPont products in it. We also continue to save lives and protect property with materials like Kevlar® and Tyvek®.

A distinct advantage of our corporate longevity is that we've seen pretty much everything that two centuries of turbulent world history can throw at a company. We're still here because we learned to be resilient. We learned how to use science to innovate. And we learned how to transform ourselves whenever fundamental transformation was called for.

From the vantage point of that long view, we see global business at a critical inflection point right now.

Global population growth is increasing demand for food, fuel and protection. Global companies that succeed in responding to this demand will do so because they master the art of collaboration across companies, countries and sectors. We're adopting a new model of innovation that we call inclusive innovation. It means innovating to solve problems by designing solutions in close cooperation with those who will benefit directly from the product.

So the corn hybrid planted by a farmer in Iowa will not necessarily be the same hybrid planted by a farmer in Kenya. The solar panel for a commercial installation in Germany may well be different from the panel destined for a rural village in India.



This has ramifications not just for global companies, but also for members of the global workforce—especially well-educated, highly motivated young people in the work force. In other words, you.

You are already part of a generation of working people who will spend your careers competing for every job you get with other professionals—not just in the same state or region, but everywhere in the world.

I see this playing out on a daily basis. Last year at DuPont we hired over 2,000 full-service employees in the U.S.—that's about eight people every business day, many of them engineers or scientists. But we also hired engineers, scientists and business professionals in India, China, and elsewhere. Regardless of where we did the hiring, we had the same standards and looked for the same things among the candidates.

**First and most obvious, we looked for skills and creativity.** Skills and creativity ought to be among the fruits of your years here at Lehigh. They are the products of a high quality higher education—which our American universities still do better than any other country in the world.

**We also look for how well a candidate works with others.** No one in a contemporary work environment succeeds alone. We are all members of teams.

You probably first learned this doing community service in high school or during your time here at Lehigh. And believe it or not, those group projects you dreaded because you had to depend on a lab partner or on two or three other students to help you get a good grade were actually preparing you for the real world!

**Because the byword of success in every field at this point in the 21st century is collaboration.** The problems we face are too big and too complex for anyone to solve alone. Your career, if it is to be a successful one, will be a series of collaborations as a member of many different teams.

**And the secret to being a valued contributor to those teams will be your development as a lifelong learner.** I studied mechanical engineering and management. Back then, I did not think of myself as a leader or a strategist—but 30 years later, that's what I do. I recognized I had to learn to develop those qualities if I wanted to advance to the next level. Some of this you will discover within you, but much of it will be learned formally and informally as you progress.

For example, I am aware that we tend to relearn the same lessons over and over, so lately I have been reading business history. It helps me analyze and contextualize the challenges I face and the decisions I make.

In DuPont's rich legacy of scientific research, we have had many great scientists, but only one who won the Nobel Prize for chemistry. He was a master's degree chemist who also wrote poems, painted watercolors, watched birds and was an avid fisherman. One day, late in his career, when an experiment failed, he had the presence of mind not to throw out the test tube but to analyze the gooey brown residue in the bottom of it. It turned out to be a whole new class of chemicals that he named the crown ethers. Charlie Pedersen would have been the first to say he was a lifelong learner.

Lifelong learning will be more critical for you than for any generation that has preceded you. For you, it may be social media or some other tool or technology that will be the conduit for new knowledge and understanding. But I can assure you that whole industries will come and go during your careers. All the clichés you ever heard about the speed of change are true. You will have to be alert and adaptable.

Finally, let me say that most organizations have a set of core values. What constitutes those values will vary from institution to institution. What matters is that the values are taken seriously, that the organization is motivated by something of intrinsic importance.

**The best organizations are looking for people who are open to accepting the institution's values and embracing them.** At DuPont our values are safety and health, environmental stewardship, highest ethical behavior and respect for people. We, as a company, continue to change. Our values don't. They are how we navigate change. They're non-negotiable.

So today I urge you to avoid the temptation to think you're done. Instead, cultivation of the softer skills of persuasion, leadership, teamwork, and personal development should be kicking into a higher gear now. They will help you get your career started, and they are likely to determine where you end up. The good news is that with your Lehigh education, you already have a head start on much of the world. I wish you continued success and the best of luck and good fortune.

Thank you.

Posted on Tuesday, May 24, 2011



## Engineering Perspective



*Allen A. Kozinski was recently appointed vice president of research and development for Amoco Oil Company in Naperville, Illinois. Previously, he managed the Salt Lake Refinery and Business Unit for Amoco and, in the early '70s, was an assistant professor of chemical engineering at UIUC.*

### *Appraisal by Impression*

"Appraisal by impression" was a phrase used by an engineer recently in commenting on why he was reluctant to speak out in front of management. As technically trained people, we prefer to be judged by our accomplishments, not by how slick our presentations are. The simple, elegant solution to a problem should be recognized and rewarded, but in the real world often isn't.

I have been fortunate to enjoy a wide variety of opportunities in my technical career from graduate student to assistant professor, from planning coordinator to refinery manager, and from research engineer to research manager. Looking up and down the various career ladders, I have observed that a distinguishing characteristic between successful and not so successful, but equally able engineers and scientists, has usually been outstanding communication skills.

I still remember the feeling of relief as a freshman on getting a B in Rhetoric 102 and, hence, not being required to take the competency test in the junior year. "Finished with grammar!" I didn't anticipate that the more important competency test would come after the senior year—on the job. I should have known more by my senior year when I took a proficiency exam for history credit and received a comment from the

grader that I passed the exam but I was lucky that it wasn't on grammar or spelling. At the time I thought, "What does a liberal arts major know? I am not going to write for a living." In fact, I have probably spent 50% or more of my working hours writing and speaking. This is very typical for engineers regardless of career path. An engineering professor writes grant proposals and papers as well as delivers lectures. Whether the audience is peers or students, the goal is to communicate ideas. The same is true for an engineer in industry—only the audiences are peers in other parts of the company or management. Again, the goal is to communicate ideas. Your audiences form an impression of you through your communications. The care shown for grammar, spelling, and organization are used as indicators of the quality of the technical results. Although engineering curricula at universities such as Illinois now include more direct studies and emphasis on communication skills, far more practice and a lifelong commitment by each individual is needed to become that competent professional who is distinguished from the crowd by excellent communication skills.

Public speaking courses and toastmaster programs are good ways to learn public speaking skills but I have found that, although not readily available to engineers in industry, teaching is one of the most demanding but effective ways to develop speaking skills. It is an excellent tool for learning to think on your



## Engineering Perspective (cont'd)

fect, especially because students are usually far more blunt than supervisors in industry who are trained to be tactful. In addition, the preparation before class, the presentation to the class, and the demanding interaction that interested students provide have a direct parallel with industrial presentations. The difference is that teaching provides practice three times a week versus several times a year in industry. Hence, opportunities to teach a high school class—through programs such as Junior Achievement or science clubs—or to teach at a junior college, should not be neglected.

One of the best ways I have found for improving writing skills is editing the work of others. Although it takes time from your own projects, it teaches you to dissect and judge your own creations for clarity, grammar, and spelling. Once again, practice is the secret of success.

The final suggestion is to seek out, rather than avoid, opportunities to make presentations and to write. Usually, managers must "persuade" young engineers to participate in activities that require speaking or writing. These skills must be practiced to improve and will be needed throughout your career. I still spend the majority of my time writing and speaking and I still need more practice. Your technical accomplishments will be the basis of your success but only if organized and presented well. The impression you make with your communication is what determines how your work will be appraised.

Whatever part of the technical world we work in, the rewards of success—namely money, promotions, and, most important, the opportunity to control and to work on exciting assignments—are generally given to those who elegantly present as well as find the elegant solution.

*I have observed that a distinguishing characteristic between successful and not so successful, but equally able engineers and scientists, has usually been outstanding communication skills.*



### Speaking Up

*A few years after I graduated, my boss and I had attended a meeting. As we were returning to our offices, my boss paused and said, "Mike, we are paying you for what's between your ears.*

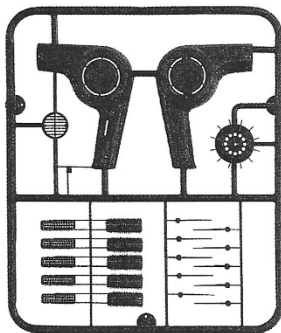
*When we are in an important meeting and you do not share your thoughts and ideas, we're not getting our money's worth!" By the time I got to my office, I had figured out that if I did not participate in meetings, I could soon be fired.*

*This experience clearly demonstrates that there is great risk for not participating in meetings and big rewards when you can make meaningful contributions.*

# From the Editor

## A Strategy for One's Life

Illustrating this month's Spotlight package is **Michael Johansson**, a Sweden-based artist who combines everyday objects in provocative ways, sometimes as if they were model kits.



**ABOVE**  
*Engine Bought Separately—Hugin II, 2007*  
 hair dryer, welded metal frame, spray paint  
 0.6 x 0.75 x 0.1 m

In the July–August issue of this magazine, we published a powerful essay by the celebrated Harvard Business School professor Clayton M. Christensen titled “How Will You Measure Your Life?”

The article came to be after HBR’s editor, Karen Dillon, heard students buzzing about a hugely inspiring talk on the meaning of life and work that Clay had just delivered at the school. She asked him to turn his speech into an article for HBR. Clay wrote eloquently in the piece of the need to create a guiding strategy for one’s life, to find a purpose that transcends ambition’s standard pursuits.

It’s one of the most resonant works we’ve ever published. In the days just after we posted it, hundreds of thousands of people came to [hbr.org](http://hbr.org) to read it, and commentators around the world were inspired by Clay’s message. On August 3 David Brooks wrote a column in the *New York Times* urging readers to consider following Clay’s prescription for “what you might call the Well-Planned Life.” The column was the most often e-mailed article in the *Times* that day.

HBR readers are already familiar with Clay’s insightful mind. He has written or coauthored more than a dozen HBR articles—including the seminal 2000 piece “Meeting the Challenge of Disruptive Change”—and seven books, including *The Innovator’s Dilemma* (Harvard Business

Review Press, 1997), *The Innovator’s Solution* (HBRP, 2003), and *Innovation Killers: How Financial Tools Destroy Your Capacity to Do New Things* (HBRP, 2010).

Yet as Clay continues to work on management’s biggest challenges, he is facing a tougher test: his own health. In December he received a diagnosis of follicular lymphoma. He completed chemotherapy in April, and the results have been, in his words, “miraculous”: The tumors appear to have subsided completely. In July, however, he suffered an ischemic stroke. Because of the speed with which he received medical treatment—less than an hour after the stroke occurred—and the diligence he is putting into his rehabilitation, his doctors are encouraged by his enormous progress so far, and a full recovery is expected. We all hope it will be rapid. In the meantime, we’ve decided to keep Clay’s piece free on [hbr.org](http://hbr.org) until the end of this month, so that more people can be inspired by his ideas. As one reader commented on our site: “Values and relationships are what ultimately matter, and if we do not pursue a legacy, we will have gone into business and management in vain. Thank you, Clayton!”

Adi Ignatius, Editor in Chief



# How Will You Measure Your Life?

*Don't reserve your best business thinking for your career.*

[ BY CLAYTON M. CHRISTENSEN ]

**EDITOR'S NOTE:** When the members of the class of 2010 entered business school, the economy was strong and their post-graduation ambitions could be limitless. Just a few weeks later, the economy went into a tailspin. They've spent the past two years recalibrating their worldview and their definition of success.

The students seem highly aware of how the world has changed (as the sampling of views in this article shows). In the spring, Harvard Business School's gradu-

ating class asked HBS professor Clay Christensen to address them—but not on how to apply his principles and thinking to their post-HBS careers. The students wanted to know how to apply them to their personal lives. He shared with them a set of guidelines that have helped him find meaning in his own life. Though Christensen's thinking comes from his deep religious faith, we believe that these are strategies anyone can use. And so we asked him to share them with the readers of HBR.





Before I published *The Innovator's Dilemma*, I got a call from Andrew Grove, then the chairman of Intel. He had read one of my early papers about disruptive technology, and he asked if I could talk to his direct reports and explain my research and what it implied for Intel. Excited, I flew to Silicon Valley and showed up at the appointed time, only to have Grove say, "Look, stuff has happened. We have only 10 minutes for you. Tell us what your model of disruption means for Intel." I said that I couldn't—that I needed a full 30 minutes to explain the model, because only with it as context would any comments about Intel make sense. Ten minutes into my explanation, Grove interrupted: "Look, I've got your model. Just tell us what it means for Intel."

I insisted that I needed 10 more minutes to describe how the process of disruption had worked its way through a very different industry, steel, so that he and his team could understand how disruption worked. I told the story of how Nucor and other steel minimills had begun by attacking the lowest end of the market—steel reinforcing bars, or rebar—and later moved up to-

ward the high end, undercutting the traditional steel mills.

When I finished the minimill story, Grove said, "OK, I get it. What it means for Intel is..." and then went on to articulate what would become the company's strategy for going to the bottom of the market to launch the Celeron processor.

I've thought about that a million times since. If I had been suckered into telling Andy Grove what he should think about the microprocessor business, I'd have been killed. But instead of telling him what to think, I taught him how to think—and then he reached what I felt was the correct decision on his own.

ILLUSTRATIONS: LEFT, MICHAEL HALBERT; RIGHT, NOU NOVAK



**“** I came to business school knowing exactly what I wanted to do—and I’m leaving choosing the exact opposite. I’ve worked in the private sector all my life, because everyone always told me that’s where smart people are. But I’ve decided to try government and see if I can find more meaning there.

“I used to think that industry was very safe. The recession has shown us that nothing is safe.”

**RUHANA HAFIZ**  
Harvard Business School  
Class of 2010

**HER PLANS:** To join the FBI as a special adviser (a management track position)

That experience had a profound influence on me. When people ask what I think they should do, I rarely answer their question directly. Instead, I run the question aloud through one of my models. I’ll describe how the process in the model worked its way through an industry quite different from their own. And then, more often than not, they’ll say, “OK, I get it.” And they’ll answer their own question more insightfully than I could have.

My class at HBS is structured to help my students understand what good management theory is and how it is built. To that backbone I attach different models or theories that help students think about the various dimensions of a general manager’s job in stimulating innovation and growth. In each session we look at one company through the lenses of those theories—using them to explain how the company got into its situation and to examine what managerial actions will yield the needed results.

On the last day of class, I ask my students to turn those theoretical lenses on themselves, to find cogent answers to three questions: First, how can I be sure that I’ll be happy in my career? Second, how can I be sure that my relationships with my spouse and my family become an enduring source of happiness? Third, how can I be sure I’ll stay out of jail? Though the last question sounds lighthearted, it’s not. Two of the 32 people in my Rhodes scholar class spent time in jail. Jeff Skilling of Enron fame was a classmate of mine at HBS. These were good guys—but something in their lives sent them off in the wrong direction.

As the students discuss the answers to these questions, I open my own life to them as a case study of sorts, to illustrate how they can use the theories from our course to guide their life decisions.

One of the theories that gives great insight on the first question—how to be sure we find happiness in our careers—is from Frederick Herzberg, who asserts that the powerful motivator in our lives isn’t money; it’s the opportunity to learn, grow in responsibilities, contribute to others, and be recognized for achievements. I tell the students about a vision of sorts I had while I was running the company I founded before becoming an academic. In my mind’s eye I saw one of my managers leave for work one morning with a relatively strong level of self-esteem. Then I pictured her driving home to her family 10 hours later, feeling unappreciated, frustrated, underutilized, and demeaned. I imagined how profoundly her lowered self-esteem affected the way she interacted with her children. The vision in my mind then fast-forwarded

to another day, when she drove home with greater self-esteem—feeling that she had learned a lot, been recognized for achieving valuable things, and played a significant role in the success of some important initiatives. I then imagined how positively that affected her as a spouse and a parent. My conclusion: Management is the most noble of professions if it’s practiced well. No other occupation offers as many ways to help others learn and grow, take responsibility and be recognized for achievement, and contribute to the success of a team. More and more MBA students come to school thinking that a career in business means buying, selling, and investing in companies. That’s unfortunate. Doing deals doesn’t yield the deep rewards that come from building up people.

I want students to leave my classroom knowing that.

### Create a Strategy for Your Life

A theory that is helpful in answering the second question—How can I ensure that my relationship with my family proves to be an enduring source of happiness?—concerns how strategy is defined and implemented. Its primary insight is that a company’s strategy is determined by the types of initiatives that management invests in. If a company’s resource allocation process is not managed masterfully, what emerges from it can be very different from what management intended. Because companies’ decision-making systems are designed to steer investments to initiatives that offer the most tangible and immediate returns, companies shortchange investments in initiatives that are crucial to their long-term strategies.

Over the years I’ve watched the fates of my HBS classmates from 1979 unfold; I’ve seen more and more of them come to reunions unhappy, divorced, and alienated from their children. I can guarantee you that not a single one of them graduated with the deliberate strategy of getting divorced and raising children who would become estranged from them. And yet a shocking number of them implemented that strategy. The reason? They didn’t keep the purpose of their lives front and center as they decided how to spend their time, talents, and energy.

It’s quite startling that a significant fraction of the 900 students that HBS draws each year from the world’s best have given little thought to the purpose of their lives. I tell the students that HBS might be one of their last chances to reflect deeply on that



## Doing deals doesn't yield the deep rewards that come from building up people.

question. If they think that they'll have more time and energy to reflect later, they're nuts, because life only gets more demanding: You take on a mortgage; you're working 70 hours a week; you have a spouse and children.

For me, having a clear purpose in my life has been essential. But it was something I had to think long and hard about before I understood it. When I was a Rhodes scholar, I was in a very demanding academic program, trying to cram an extra year's worth of work into my time at Oxford. I decided to spend an hour every night reading, thinking, and praying about why God put me on this earth. That was a very challenging commitment to keep, because every hour I spent doing that, I wasn't studying applied econometrics. I was conflicted about whether I could really afford to take that time away from my studies, but I stuck with it—and ultimately figured out the purpose of my life.

Had I instead spent that hour each day learning the latest techniques for mastering the problems of autocorrelation in regression analysis, I would have badly misspent my life. I apply the tools of econometrics a few times a year, but I apply my knowledge of the purpose of my life every day. It's the single most useful thing I've ever learned. I promise my students that if they take the time to figure out their life purpose, they'll look back on it as the most important thing they discovered at HBS. If they don't figure it out, they will just sail off without a rudder and get buffeted in the very rough seas of life. Clarity about their purpose will trump knowledge of activity-based costing, balanced scorecards, core competence, disruptive innovation, the four Ps, and the five forces.

My purpose grew out of my religious faith, but faith isn't the only thing that gives people direction. For example, one of my former students decided that his purpose was to bring honesty and economic prosperity to his country and to raise children who were as capably committed to this cause, and to each other, as he was. His purpose is focused on family and others—as mine is.

ILLUSTRATIONS: MICHAEL HALBERT

The choice and successful pursuit of a profession is but one tool for achieving your purpose. But without a purpose, life can become hollow.

### Allocate Your Resources

**Y**our decisions about allocating your personal time, energy, and talent ultimately shape your life's strategy.

I have a bunch of "businesses" that compete for these resources: I'm trying to have a rewarding relationship with my wife, raise great kids, contribute to my community, succeed in my career, contribute to my church, and so on. And I have exactly the same problem that a corporation does. I have a limited amount of time and energy and talent. How much do I devote to each of these pursuits?

Allocation choices can make your life turn out to be very different from what you intended. Sometimes that's good: Opportunities that you never planned for emerge. But if you misinvest your resources, the outcome can be bad. As I think about my former classmates who inadvertently invested for lives of hollow unhappiness, I can't help believing that their troubles relate right back to a short-term perspective.

When people who have a high need for achievement—and that includes all Harvard Business School graduates—have an extra half hour of time or an extra ounce of energy, they'll unconsciously allocate it to activities that yield the most tangible accomplishments. And our careers provide the most concrete evidence that we're moving forward. You ship a product, finish a design, complete a presentation, close a sale, teach a class, publish a paper, get paid, get promoted. In contrast, investing time and energy in your relationship with your spouse and children typically doesn't offer that same immediate sense of achievement. Kids misbehave every day. It's really not until 20 years down the road that you can put your hands on your hips and say, "I raised a good son or a good daughter." You can neglect your relationship with your spouse, and on a day-to-day basis,

**Q** You could see a shift happening at HBS. Money used to be number one in the job search. When you make a ton of money, you want more of it. Ironic thing. You start to forget what the drivers of happiness are and what things are really important. A lot of people on campus see money differently now. They think, "What's the minimum I need to have, and what else drives my life?" instead of "What's the place where I can get the maximum of both?"

**PATRICK CHUN**  
Harvard Business School  
Class of 2010

**HIS PLANS:** To join Bain Capital



it doesn't seem as if things are deteriorating. People who are driven to excel have this unconscious propensity to underinvest in their families and overinvest in their careers—even though intimate and loving relationships with their families are the most powerful and enduring source of happiness.

If you study the root causes of business disasters, over and over you'll find this predisposition toward endeavors that offer immediate gratification. If you look at personal lives through that lens, you'll see the same stunning and sobering pattern: people allocating fewer and fewer resources to the things they would have once said mattered most.

### Create a Culture

There's an important model in our class called the Tools of Cooperation, which basically says that being a visionary manager isn't all it's cracked up to be. It's one thing to see into the foggy future with acuity and chart the course corrections that the company must make. But it's quite another to persuade employees who might not see the changes ahead to line up and work cooperatively to take the company in that new direction. Knowing what tools to wield to elicit the needed cooperation is a critical managerial skill.

The theory arrays these tools along two dimensions—the extent to which members of the organization agree on what they want from their participation in the enterprise, and the extent to which they agree on what actions will produce the desired results. When there is little agreement on both axes, you have to use “power tools”—coercion, threats, punishment, and so on—to secure cooperation. Many companies start in this quadrant, which is why the founding executive team must play such an assertive role in defining what must be done and how. If employees' ways of working together to address those tasks succeed over and over, consensus begins to form. MIT's Edgar Schein has described this process as the mechanism by which a culture is built. Ultimately, people don't even think about whether their way of doing things yields success. They embrace priorities and follow procedures by instinct and assumption rather than by explicit decision—which means that they've created a culture. Culture, in compelling but unspoken ways, dictates the proven, acceptable methods by which members of the group address recurrent problems. And culture defines the priority given to different types of problems. It can be a powerful management tool.

In using this model to address the question, How can I be sure that my family becomes an enduring source of happiness?, my students quickly see that the simplest tools that parents can wield to elicit cooperation from children are power tools. But there comes a point during the teen years when power tools no longer work. At that point parents start wishing that they had begun working with their children at a very young age to build a culture at home in which children instinctively behave respectfully toward one another, obey their parents, and choose the right thing to do. Families have cultures, just as companies do. Those cultures can be built consciously or evolve inadvertently.

If you want your kids to have strong self-esteem and confidence that they can solve hard problems, those qualities won't magically materialize in high school. You have to design them into your family's culture—and you have to think about this very early on. Like employees, children build self-esteem by doing things that are hard and learning what works.

### Avoid the “Marginal Costs” Mistake

We're taught in finance and economics that in evaluating alternative investments, we should ignore sunk and fixed costs, and instead base decisions on the marginal costs and marginal revenues that each alternative entails. We learn in our course that this doctrine biases companies to leverage what they have put in place to succeed in the past, instead of guiding them to create the capabilities they'll need in the future. If we knew the future would be exactly the same as the past, that approach would be fine. But if the future's different—and it almost always is—then it's the wrong thing to do.

This theory addresses the third question I discuss with my students—how to live a life of integrity (stay out of jail). Unconsciously, we often employ the marginal cost doctrine in our personal lives when we choose between right and wrong. A voice in our head says, “Look, I know that as a general rule, most people shouldn't do this. But in this particular extenuating circumstance, just this once, it's OK.” The marginal cost of doing something wrong “just this once” always seems alluringly low. It suckers you in, and you don't ever look at where that path ultimately is headed and at the full costs that the choice entails. Justification for infidelity and dishonesty in all their manifestations lies in the marginal cost economics of “just this once.”

**“**The financial crisis helped me realize that you have to do what you really love in life. My current vision of success is based on the impact I can have, the experiences I can gain, and the happiness I can find personally, much more so than the pursuit of money or prestige. My main motivations are (1) to be with my family and people I care about; (2) to do something fun, exciting, and impactful; and (3) to pursue a long-term career in entrepreneurship, where I can build companies that change the way the world works.”

**MATT SALZBERG**  
Harvard Business School  
Class of 2010

**HIS PLANS:** To work for  
Bessemer Venture Partners





I'd like to share a story about how I came to understand the potential damage of "just this once" in my own life. I played on the Oxford University varsity basketball team. We worked our tails off and finished the season undefeated. The guys on the team were the best friends I've ever had in my life. We got to the British equivalent of the NCAA tournament—and made it to the final four. It turned out the championship game was scheduled to be played on a Sunday. I had made a personal commitment to God at age 16 that I would never play ball on Sunday. So I went to the coach and explained my problem. He was incredulous. My teammates were, too, because I was the starting center. Every one of the guys on the team came to me and said, "You've got to play. Can't you break the rule just this one time?"

I'm a deeply religious man, so I went away and prayed about what I should do. I got a very clear feeling that I shouldn't break my commitment—so I didn't play in the championship game.

In many ways that was a small decision—involving one of several thousand Sundays in my life. In theory, surely I could have crossed over the line just that one time and then not done it again. But looking back on it, resisting the temptation whose logic was "In this extenuating circumstance, just this once, it's OK" has proven to be one of the most important decisions of my life. Why? My life has been one unending stream of extenuating circumstances. Had I crossed the line that one time, I would have done it over and over in the years that followed.

The lesson I learned from this is that it's easier to hold to your principles 100% of the time than it is to hold to them 98% of the time. If you give in to "just this once," based on a marginal cost analysis, as some of my former classmates have done, you'll regret where you end up. You've got to define for yourself what you stand for and draw the line in a safe place.

### Remember the Importance of Humility

I got this insight when I was asked to teach a class on humility at Harvard College. I asked all the students to describe the most humble person they knew. One characteristic of these humble people stood out: They had a high level of self-esteem. They knew who they were, and they felt good about who they were. We also decided that humility was defined not by self-deprecating behavior or attitudes but by the esteem with which you regard others. Good behavior flows naturally

from that kind of humility. For example, you would never steal from someone, because you respect that person too much. You'd never lie to someone, either.

It's crucial to take a sense of humility into the world. By the time you make it to a top graduate school, almost all your learning has come from people who are smarter and more experienced than you: parents, teachers, bosses. But once you've finished at Harvard Business School or any other top academic institution, the vast majority of people you'll interact with on a day-to-day basis may not be smarter than you. And if your attitude is that only smarter people have something to teach you, your learning opportunities will be very limited. But if you have a humble eagerness to learn something from everybody, your learning opportunities will be unlimited. Generally, you can be humble only if you feel really good about yourself—and you want to help those around you feel really good about themselves, too. When we see people acting in an abusive, arrogant, or demeaning manner toward others, their behavior almost always is a symptom of their lack of self-esteem. They need to put someone else down to feel good about themselves.


### Choose the Right Yardstick

This past year I was diagnosed with cancer and faced the possibility that my life would end sooner than I'd planned. Thankfully, it now looks as if I'll be spared. But the experience has given me important insight into my life.

I have a pretty clear idea of how my ideas have generated enormous revenue for companies that have used my research; I know I've had a substantial impact. But as I've confronted this disease, it's been interesting to see how unimportant that impact is to me now. I've concluded that the metric by which God will assess my life isn't dollars but the individual people whose lives I've touched.

I think that's the way it will work for us all. Don't worry about the level of individual prominence you have achieved; worry about the individuals you have helped become better people. This is my final recommendation: Think about the metric by which your life will be judged, and make a resolution to live every day so that in the end, your life will be judged a success. ♡

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**“**Because I'm returning to McKinsey, it probably seems like not all that much has changed for me. But while I was at HBS, I decided to do the dual degree at the Kennedy School. With the elections in 2008 and the economy looking shaky, it seemed more compelling for me to get a better understanding of the public and nonprofit sectors. In a way, that drove my return to McKinsey, where I'll have the ability to explore private, public, and nonprofit sectors.  
**“**The recession has made us step back and take stock of how lucky we are. The crisis to us is 'Are we going to have a job by April?' Crisis to a lot of people is 'Are we going to stay in our home?'"

**JOHN COLEMAN**  
Harvard Business School  
Class of 2010

**HIS PLANS:** To return to McKinsey & Company

## **Why Constant Learners All Embrace the 5-Hour Rule**

**Benjamin Franklin did this 1 hour a day, 5 hours a week.**

**Why you should do it too.**

Michael Simmons, co-founder of Empact, with Ian Chew  
Inc.com  
June 20, 2016

At the age of 10, Benjamin Franklin left formal schooling to become an apprentice to his father. As a teenager, he showed no particular talent or aptitude aside from his love of books. When he died a little over half a century later, he was America's most respected statesman, its most famous inventor, a prolific author, and a successful entrepreneur.

What happened between these two points to cause such a meteoric rise? Underlying the answer to this question is a success strategy for life that we can all use, and increasingly *must* use.

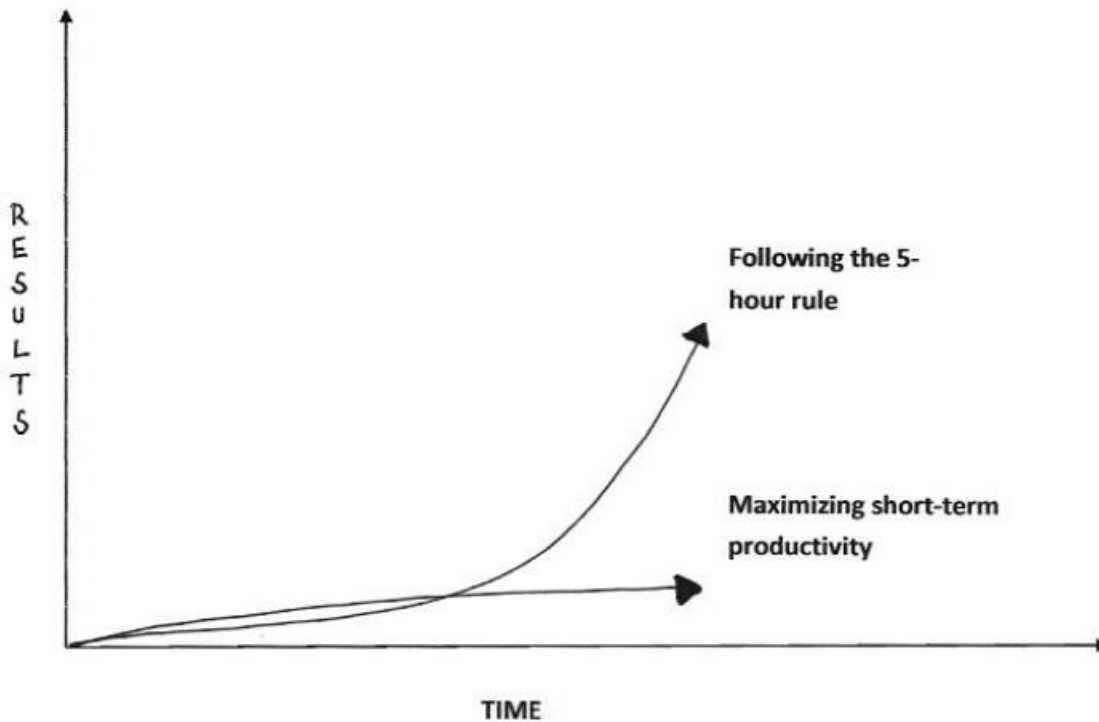
### **The Five-Hour Rule**

Throughout Ben Franklin's adult life, he consistently invested roughly an hour a day in deliberate learning. I call this Franklin's five-hour rule: one hour a day on every weekday.

Franklin's learning time consisted of:

- Waking up early to read and write
- Setting personal-growth goals (i.e., virtues list) and tracking the results
- Creating a club for "like-minded aspiring artisans and tradesmen who hoped to improve themselves while they improved their community"
- Turning his ideas into experiments
- Having morning and evening reflection questions

Every time that Franklin took time out of his busy day to follow his five-hour rule and spend at least an hour learning, he accomplished less on that day. However, in the long run, it was arguably the best investment of his time he could have made.



Franklin's five-hour rule reflects the very simple idea that, over time, the smartest and most successful people are the ones who are constant and deliberate learners.

So what would it look like to make the five-hour rule part of our lifestyle?

### **The Core Concept of the Five-Hour Rule: Empty Space**

To find out, we need look no further than chess grandmaster and world-champion martial artist Josh Waitzkin. Instead of squeezing his days for the maximum productivity, he's actually done the opposite. Waitzkin, who also authored *The Art of Learning*, purposely creates slack in his day so he has "empty space" for learning, creativity, and doing things at a higher quality.

Here's his explanation of this approach from a recent Tim Ferriss podcast episode:

I have built a life around having empty space for the development of my ideas for the creative process. And for the cultivation of a physiological state which is receptive enough to tune in very, very deeply to people I work with. . . . In the creative process, it's so easy to

drive for efficiency and take for granted the really subtle internal work that it takes to play on that razor's edge.

Adding slack to our day allows us to:

1. *Plan out the learning.* This allows us to think carefully about what we want to learn. We shouldn't just have goals for what we want to accomplish. We should also have goals for what we want to learn.
2. *Deliberately practice.* Rather than doing things automatically and not improving, we can apply the proven principles of deliberate practice so we keep improving. This means doing things like taking time to get honest feedback on our work and practicing specific skills we want to improve.
3. *Ruminate.* This helps us get more perspective on our lessons learned and assimilate new ideas. It can also help us develop slow hunches in order to have creative breakthroughs. Walking is a great way to process these insights, as shown by many greats who were or are walking fanatics, from Beethoven and Charles Darwin to Steve Jobs and Jack Dorsey. Another powerful way is through conversation partners.
4. *Set aside time just for learning.* This includes activities like reading, having conversations, participating in a mastermind, taking classes, observing others, etc.
5. *Solve problems as they arise.* When most people experience problems during the day, they sweep them under the rug so that they can continue their to-do list. Having slack creates the space to address small problems before they turn into big problems.
6. *Do small experiments with big potential payoffs.* Whether or not an experiment works, it's an opportunity to learn and test your ideas. . . .

### **So, Are You Ready to Embrace the Five-Hour Rule?**

How about reading a book a week to get started? Even though he's the richest man in the world and could afford to hire an army of teachers and consultants, Bill Gates still reads a book a week. In a 2016 *New York Times* interview, he said, "Reading is still the main way that I both learn new things and test my understanding."

## Hard to Find: Workers with Good “Soft Skills”

Kate Davidson, Wall Street Journal  
Aug. 31, 2016

The job market’s most sought-after skills can be tough to spot on a résumé.

Companies across the U.S. say it is becoming increasingly difficult to find applicants who can communicate clearly, take initiative, problem-solve and get along with co-workers. Those traits, often called soft skills, can make the difference between a standout employee and one who just gets by.

While such skills have always appealed to employers, decades-long shifts in the economy have made them especially crucial now. Companies have automated or outsourced many routine tasks, and the jobs that remain often require workers to take on broader responsibilities that demand critical thinking, empathy or other abilities that computers can’t easily simulate.

As the labor market tightens, competition has heated up for workers with the right mix of soft skills, which vary by industry and across the pay spectrum—from making small talk with a customer at the checkout counter, to coordinating a project across several departments on a tight deadline.

In pursuit of the ideal employee, companies are investing more time and capital in teasing out job applicants’ personality quirks, sometimes hiring consultants to develop tests or other screening methods, and beefing up training programs to develop a pipeline of candidates.

“We’ve never spent more money in the history of our firm than we are now on recruiting,” said Keith Albritton, chief executive of Allen Investments, an 84-year-old wealth-management company in Lakeland, Fla. In 2014, the firm hired an industrial psychologist who helped it identify the traits of its top-performing employees, and then developed a test for job candidates to determine how closely they fit the bill.

In the increasingly complex financial-services world, advisers often collaborate with accountants, attorneys and other planning professionals, Mr. Albritton said. That means the firm’s associates must be able to work in teams. “You can’t just be the general of your own army,” he said.

A recent LinkedIn survey of 291 hiring managers found 58% say the lack of soft skills among job candidates is limiting their company’s productivity. In a Wall Street Journal survey of nearly 900 executives last year, 92% said soft skills were equally important or more important than technical skills. But 89% said they have a very or somewhat difficult time finding people with the requisite attributes. Many say it’s a problem spanning age groups and experience levels.

A LinkedIn analysis of its member profiles found soft skills are most prevalent among workers in the service sector, including restaurant, consumer-services, professional-training and retail industries. To determine the most sought-after soft skills, LinkedIn analyzed those listed on the profiles of members who applied for two or more jobs and changed jobs between June 2014 and June 2015. The ability to communicate trumped all else, followed by organization, capacity for teamwork, punctuality, critical thinking, social savvy, creativity and adaptability.

Workers with these traits aren't easy to come by, said Cindy Herold, who runs the Old Europe restaurant in Washington. In a moment of frustration, Mrs. Herold recently put a sign outside seeking workers with "common sense." "I can teach somebody how to slice and dice onions. I can teach somebody how to cook a soup. But it's hard to teach someone normal manners, or what you consider work ethic," she said.

Training new workers in technical skills takes time and resources employers say they are less willing to invest in workers who don't have the soft skills to succeed in the long run. That may be one reason hiring has lagged behind its prerecession pace despite a near-record number of job openings, according to Labor Department data.

With a stubbornly high share of Americans looking for work or stuck in part-time jobs, employers should have plenty of job candidates, but many of them aren't biting—at least not very quickly. Academic research also suggests demand for those workers is picking up. Employment growth has been especially strong in jobs requiring both cognitive and soft skills, according to a 2015 paper from Harvard economist David Deming, who found that pattern held true up and down the wage scale.

Paul McDonald, an executive at staffing firm Robert Half, said soft skills have always been important tools for managers, but now employers are finding them more important than ever before "at the lower end of the org chart," and "the focus is earlier on in one's career."

The combination of soft skills and high grades can attract multiple job offers and premium starting salaries for recent college graduates in technical fields such as computer sciences, accounting and finance, he said.

Many employers, frustrated by the difficulty of identifying job candidates with the right soft skills, have adopted more rigorous hiring practices. At Two Bostons, a small chain of pet boutiques outside Chicago, owner AdreAnne Tesene conducts at least three rounds of interviews before she hires someone. Ms. Tesene, who opened her first store 11 years ago, said she sees fewer candidates who can hold a conversation, want to interact with people and are eager to excel. "Trying to find people like that is becoming harder," she said. "But also, I think our standards continue to increase."



## SERIAL BLOOMER: PAT GELSINGER



**PAT GELSINGER**, the CEO of VMware—a \$6.6 billion software company—has had a career rise that’s an American throwback. His story is that of an unknown farm boy whose talents were revealed in a trade-school test, thus propelling the boy to his first Silicon Valley high-tech job without even a four-year college degree. That rarely happens anymore. Silicon Valley has become a data-driven, talent-sorting machine that automatically rejects all but the most obvious winners.

Growing up on the family farm in Robesonia, Pa., Gelsinger knew hard work from a young age. “Our family raised dairy cows, pigs, soybeans and sorghum.” Gelsinger learned to wake at 5 a.m. to “go straight to a day of dusty labor and try not to get kicked by an animal.”

Predictably, Gelsinger rebelled. He was a self-described smart aleck in high school, hanging out with the wrong kids and going nowhere. But one day he aced an electronics technology test given by the Lincoln Technical Institute, and the seed for achievement was planted. By age 18—having trained himself to sleep five hours a night—Gelsinger had completed two degrees: a Robesonia high school diploma and an associate degree from Lincoln Tech. As luck would have it, a recruiter from a young California company, Intel, interviewed the top Lincoln grads. And at 18 Gelsinger took his first plane trip, to Silicon Valley, and began work as an Intel quality-control technician.

It wasn’t long before Gelsinger “wanted to be on the other side of the table ... the engineer who decided what to do, not the technician who did the grunt work.” Intel had a generous tuition-reimbursement program, and Gelsinger earned his electrical engineering degrees at Santa Clara University and Stanford, while holding down his Intel job.

Working on Intel’s 386 processor in the 1980s, Gelsinger caught the attention of soon-to-be-CEO Andy Grove. Grove surprised Gelsinger with a phone call and began bluntly quizzing him about his goals at Intel. Gelsinger was so intimidated he could barely speak. Grove said, “Those are lousy answers. Be in my office within two weeks with better ones.”

By the late 1980s Gelsinger had risen to chief architect of Intel’s 486 processor, the globally dominant chip in PCs and laptops. Not long after, he became Intel’s first chief technical officer.

### FAITH AND ENDURANCE

Sensing he would never break out of the tech-management ghetto at Intel, Gelsinger moved to computer storage giant EMC, in Massachusetts. He left Intel with a renewed determination to become a CEO someday. He asked and received permission to attend EMC board

meetings, where he would seek out two members per meeting for coaching. One board member was EMC cofounder Richard Egan, who told Gelsinger to “dress like a CEO” and “learn corporate finance.”

The next weekend Gelsinger and his wife went to a Nordstrom’s department store to upgrade his wardrobe. He then hired a Columbia University finance professor to tutor him privately. “I remember a vacation during which my wife read novels and I read Corporate Finance, an 1,100-page book.” Gelsinger says.

Gelsinger’s unusual rise to CEO is a high-profile lesson in how to keep moving forward in one’s career. “Why, then,” I asked him, “do the majority of smart and talented people manage to get stuck?”

We were meeting in Gelsinger’s office at VMware headquarters in Palo Alto. Gelsinger works at a stand-up desk, but he sat at his table to answer. “If you asked ten people if they want to improve themselves, eight will say yes. But only two will follow through. Which means a majority of people—60% of us—lack the know-how, energy or discipline to move forward. If you really want to move forward, the answer seems obvious: Find a purpose, set goals, stay healthy and seek mentors who will hold you accountable.”

But there’s another factor in Gelsinger’s success, and he’s not shy about talking about it. He runs a company of more than 18,000 employees in a highly secular part of the U.S.—the San Francisco Bay Area, where 61% of adults don’t attend church regularly. However, Gelsinger is Silicon Valley’s most outspoken Christian CEO. He is careful to run VMware in a “non-churchy” way, using such secular words as “values and purpose” in his leadership language, but he runs his own life strictly by his faith. “My favorite Bible verse and guiding principle is Colossians 3:23: ‘Whatever you do, work at it with all your heart, as working for the Lord, not for human masters.’”

“I love that verse,” he says. “I can get the snot kicked out of me at a board meeting or during a sales call, and I can rebound the next day, full of joy and purpose, to start anew.”

RICH KARLGAARD IS THE PUBLISHER AT FORBES. HIS LATEST BOOK, *TEAM GENIUS: THE NEW SCIENCE OF HIGH-PERFORMING ORGANIZATIONS*, CAME OUT IN 2015. FOR HIS PAST COLUMNS AND BLOGS VISIT OUR WEBSITE AT [WWW.FORBES.COM/KARLGAARD](http://WWW.FORBES.COM/KARLGAARD).

# The Secret to Midcareer Success

By Michael S. Malone

Why are some top professionals able to maintain peak performance throughout long careers, while others who may be even more talented quickly fade and fall behind? And why do some lesser performers suddenly take off in midcareer and accomplish astonishing things? Two successful tech leaders offer remarkably similar answers to these questions.

Anil Singhal was born in India but emigrated to the U.S. before co-founding NetScout Systems in 1984. Based in Massachusetts, NetScout helps companies and government agencies manage their information-technology networks. A key part of Mr. Singhal's management strategy has involved helping top young employees make the transition to midcareer success. In particular, he believes that employees' "primary skills" can take them only so far.

"Those talents by which you earned your college degrees and first made your professional reputation," writes Mr. Singhal in his upcoming book, can drive success for the first 10 years of a career. After that, "secondary skills"—social qualities like the ability to interact well with colleagues—

become the key to continued success.

Mr. Singhal believes that most employers mistakenly nurture primary skills at the expense of secondary ones. This is especially true for employees who are highly productive right off the bat. Unless they move into management or

**Star employees can rise only so far unless they develop social, or 'secondary,' skills.**

mentorship roles, these increasingly expensive employees can become a drag on employers as their productivity naturally falls off.

That's where leadership comes in. Facing a career plateau is hard, especially for star employees. But developing the ability to lead creates an avenue for sustained success.

Silicon Valley icon John Hennessy was a successful engineering professor at Stanford before being promoted in quick succession to department head, dean, provost and president. "I had to learn a new set of skills in a very short amount of time," he recalled in a recent interview. Those skills were more social than technical. "When you

move from the field in which you built your career and step into leadership, your technical talent becomes less important, and data becomes just another tool."

In early midcareer, says Mr. Hennessy, professionals must develop the ability to bring people together and become mentors. They must learn how to unify a team around a single vision. "The ability to tell appropriate, compelling and inspiring stories" is essential, he says. Describing work as a journey shared among colleagues helps bring employees together in a common cause.

Leadership skills won't develop on their own—they must be actively cultivated.

That's one reason why even students who are preparing to enter technical and scientific fields should pursue a well-rounded education, including the liberal arts.

These transitions can be rocky. Without the right preparation, highly talented employees may turn out to be more resistant than their less-talented peers to adopting new roles. The secondary skills that will help them succeed in midcareer are radically different from the primary ones that brought them success in the early days. "You have to learn now enough to ask intelligent

questions, not find the answers yourself," writes Mr. Hennessy in a book on leadership to be published this fall. A mediocre technologist who is open to learning can become a great corporate executive, while a superstar scientist can turn out to be a lousy boss.

Shifting focus from personal productivity to supporting subordinates is a major part of the transition to management. Similarly, good managers must turn their attention away from the measurable metrics of the present toward a vision for the unpredictable future. For an employee looking to grow into a leadership role, these changes in perspective are as important as learning to communicate.

Why, besides the threat of declining productivity, should employers support the development of secondary skills? Because, according to Mr. Singhal, secondary skills have broad positive effects on the office as a whole. Skills like coding and accounting create value in an additive way. Communication and leadership skills are multiplicative—they help make the whole team more valuable.

Mr. Malone is dean's executive professor at Santa Clara University.



# Pat Summitt's **Definite Dozen**

## **Respect Yourself and Others**

There is no such thing as self-respect without respect for others. Individual success is a myth. No one succeeds all by themselves. People who do not respect those around them will not make good team members and probably lack self-esteem themselves. When you ask yourself, "Do I deserve to succeed?" make sure the answer is yes.

## **Take Full Responsibility**

There are no shortcuts to success. You can't assume larger responsibility without taking responsibility for the small things, too. Being responsible sometimes means making tough, unpopular decisions. Admit to and make yourself accountable for mistakes. How can you improve if you're never wrong?

## **Develop and Demonstrate Loyalty**

Loyalty is not unilateral. You have to give it to receive it. The family business model is a successful one because it fosters loyalty and trust. Surround yourself with people who are better than you are. Seek out quality people, acknowledge their talents, and let them do their jobs. You win with people.

## **Learn to Be a Great Communicator**

Communication eliminates mistakes. Listening is crucial to good communication. We communicate all the time, even when we don't realize it. Be aware of body language. Make good eye contact. Silence is a form of communication, too. Sometimes less is more.

## **Discipline Yourself So No One Else Has To**

Self-discipline helps you believe in yourself. Group discipline produces a unified effort toward a common goal. When disciplining others, be fair, be firm, be consistent. Discipline helps you finish a job, and finishing is what separates excellent work from average work.

## **Make Hard Work Your Passion**

Do the things that aren't fun first, and do them well. Plan your work, and work your plan. See yourself as self-employed.

## **Don't Just Work Hard, Work Smart**

Success is about having the right person, in the right place, at the right time. Know your strengths, weaknesses, and needs. When you understand yourself and those around you, you are better able to minimize weaknesses and maximize strengths. Personality profiles help.

## **Put the Team Before Yourself**

Teamwork doesn't come naturally. It must be taught. Teamwork allows common people to obtain uncommon results. Not everyone is born to lead. Role players are critical to group success. In group success there is individual success.

## **Make Winning an Attitude**

Combine practice with belief. Attitude is a choice. Maintain a positive outlook. No one ever got anywhere by being negative. Confidence is what happens when you've done the hard work that entitles you to succeed.

## **Be a Competitor**

Competition isn't social. It separates achievers from the average. You can't always be the most talented person in the room, but you can be the most competitive. Influence your opponent: By being competitive you can affect how your adversary performs. There is nothing wrong with having competitive instincts. They are survival instincts.

## **Change Is a Must**

It's what you learn after you know it all that counts the most. Change equals self-improvement. Push yourself to places you haven't been before. Take risks. You can't steal second base with your foot on first.

## **Handle Success Like You Handle Failure**

You can't always control what happens, but you can control how you handle it. Sometimes you learn more from losing than winning. Losing forces you to reexamine. It's harder to stay on top than it is to make the climb. Continue to seek new goals.



### **ABOUT THE AUTHOR**

Mike Stone (BS/ChE '63) has always felt very fortunate to have been able to participate in the engineering co-op program at the University of Tennessee. The most immediate benefit was that it enabled him to pay for his college education. Later, he realized how valuable the work experience was in getting his career off to a fast start. In appreciation, he has funded the John W. Prados Chemical Engineering Co-op Scholarships, the Pathways to Success class, the annual co-op awards banquet, the Co-op Leadership Program, and graduation medallions for all co-op students.

His career responsibilities progressed from production engineer, production unit supervisor, senior process engineer, project engineer, corporate development, business manager, director of sales and marketing, director of strategic planning, and vice president. He had exposure to a wide array of chemical and materials businesses with Allied Chemical, Copolymer Rubber and Chemical, Kaiser Aluminum and Chemical, and GS Roofing Products. In his last assignment, he served as vice president responsible for corporate development, corporate engineering, research and development, environment, safety, quality control, and transportation and distribution.

In 1998, he retired and moved to beautiful Lake Tahoe where he enjoys skiing, hiking, and the natural beauty of the region. He continues to spend most of his time managing his investments in stocks and real estate.

**AS AN ENGINEER, YOU ARE TRAINED** to think in terms of efficiency, optimization, reliability, quality, and cost-effectiveness. You will apply these mental disciplines to designs, devices, structures, processes, and systems. Why shouldn't you apply these same skills to your own life, thereby expanding your accomplishments and very likely tripling your career earnings? That is, how can you use a portion of your spare time in a very practical, efficient, and effective manner to maximize your lifetime value and your contributions to family and society? This booklet answers that question.

