

# Leadership for Engineers: The Magic of Mindset Executive Summary

In *Leadership for Engineers: The Magic of Mindset*, the authors share stories of emerging leaders and their experiences, as well as some critical information and tools that can help you, as a student or technical professional, reflect on your experience and decide what comes next. Each of you has untapped leadership abilities. This book will help you find and develop your inner leader, become the person you want to be, and pursue your passions in ways that are productive and rewarding for you and others.

This book identifies some common myths about leadership in technical fields, and then helps you identify your own leadership capacity in the face of false assumptions. Drawing upon decades of experience in academia and industry, the authors provide a process to identify and develop your own leadership abilities, explain why the world needs you at this perilous time, and show how you can use your best professional self to make a real difference. Each of the four parts of *Leadership for Engineers* includes four chapters comprised of testimonials from emerging leaders, as well as reflection questions at the end of each chapter. Reading through the scenarios and working through the questions will prepare you to lead in your career and your life.



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"*Leadership for Engineers: The Magic of Mindset* is a must read if you lead engineers, teach engineers, or are an engineer. And actually it applies to anyone with a technical background, not only engineers. This book is packed with insightful ideas and practical real world examples. The section on myths hits the nail on the head. And what I love about the book is that it not only identifies issues, it shows a path for individuals to find their own way to making a difference."

Louise M. Moran — Executive Director, Lockheed Martin Leadership Institute  
School of Engineering & Applied Science, Miami University

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LEADERSHIP for ENGINEERS The Magic of Mindset BENNETT | MILLAM

Basic Engineering Series and Tools

## LEADERSHIP for ENGINEERS *The Magic of Mindset*

RONALD BENNETT  
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## Foreword

By George W. Buckley, chairman, president, and CEO, 3M

As a humble electrical engineer who over the years has been blessed with many opportunities to learn and to lead, I thank Ron Bennett and Elaine Millam for their very real contribution to an important cause: to help technical professionals discover and develop their own leadership skills. There is no doubt that early in my career I would have benefited from this practical, commonsense approach to leadership development.

I am convinced that the vast majority of people have more capability than they themselves realize. For some people, these talents emerge in times of trial and crisis; others simmer their skills over the years as their experience matures into wisdom. What all leaders have in common, however, is a belief in something better: a better approach, a better technology, a better enterprise, and even a better world.

To achieve the goal of something better, a leader needs to be comfortable with a level of risk taking amidst uncertainty. A leader needs to accept the responsibility of personally making decisions, even though some decisions will be unpopular in some circles. Other decisions may well define the success or failure of a project, or even a company. As daunting as that sounds, be assured that leaders are quite human. They learn through experiences—both good and bad—and they come to understand that confidence can breed even more confidence.

Along with confidence come courage and inspiration: the courage to do what's right in the face of uncertainty and criticism and the inspiration that causes opportunity and success to overwhelm the fear of failure. Successful leaders also learn that ego is an unaffordable luxury. It's better to have your shadow on results rather than your fingerprints. After all, leading is not the same as managing or micromanaging; the leader's mindset is not the same as the manager's mindset.

*Leadership for Engineers: The Magic of Mindset* speaks directly to this important distinction. I trust you will find it as enlightening as I do.

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## **Preface**

Most leadership books are written by and about CEOs. Many are inspirational and interesting, but they seldom provide tools to help others become leaders. Yet we need leadership in industry, education, and government; we need leadership in setting public policy in our communities and country. We need leaders at all levels in every organization, not just in the executive suite.

In our view, leadership is the ability and courage to create a vision that inspires others, the ability to communicate that vision and to engage all the talent in the organization to focus on the same goal. This means you can lead no matter what your job title or position.

This book is based on our experiences in leadership training and education, and the experiences of many graduate students in the School of Engineering at the University of St. Thomas. These working adults entered the program as engineers, scientists, and other technical professionals. They shared common goals of growing, learning, and self-improvement. Along with academic and technical instruction, they were invited to discover their potential, think broadly about their contributions to society, and create plans for developing their leadership capabilities.

## **Industry and Education**

During our careers in industry, we have known many talented technical professionals. While a few were satisfied with their personal and professional accomplishments, others clearly wished for more. Among these engineers, scientists, technicians, and mathematicians, many became disillusioned with their jobs. They felt disconnected from their organizations, and did not see how their work added value.

They were not limited because they lacked technical capabilities, but because they had not developed leadership skills—or the courage and passion necessary to use them. In turn, they and their organizations were unable to benefit from these hidden or suppressed talents.

As we moved into academia, we have had the opportunity to create environments that help these professionals develop their leadership abilities, demonstrate their courage and discover their passions. If this was possible in the classroom, we believed, it should be possible in business.

### **The Need for Leadership Education**

For engineers, strong technical abilities can bring professional success—but so much more is possible. By developing leadership attributes, they can also realize increased recognition and personal satisfaction. More important, expanded skill sets let engineers make greater contributions to their organizations, their communities, and the world at large. This is reflected in requirements from the Accreditation Board for Engineering and Technology (ABET).

The Engineering Accreditation Commission of ABET specifies criteria for all engineering programs. Criterion 3, Student Outcomes, requires them to show that students attain eleven outcomes, often referred to as ‘a-k’. This book addresses six of these outcomes, which are detailed in the Appendix.

In their careers, many people educated as engineers move into management positions. Despite the ABET requirements for student outcomes, few are prepared to lead with confidence—and few are prepared by their companies to develop the skills and attitudes necessary to be good leaders in their organizations.

This book provides guidance on incorporating leadership into existing courses and activities, offering opportunities to assess and evaluate several Criterion 3 outcomes; it demonstrates the need to expand leadership education to practicing engineers, who are

the emerging leaders in their organizations; and it provides suggestions for alternative approaches, serving as a resource for self-directed study.

With the generous assistance of ASEE and leadership of the Engineering Deans Council, in 2009 we sent a leadership education survey (Bennett and Millam, 2012) to deans of engineering programs in the United States. All the respondents—100%—believe leadership education is important for engineers, yet only 46% include related courses in undergraduate programs, and just 21% in graduate curricula. Those without leadership courses have asked how to incorporate the subject into programs that are already demanding. This book provides a place to start.

### **A Decade of Discovery**

Eleven years ago, as leaders in engineering education, we began a partnership with our constituents who were sending their engineering and technology professionals to graduate school. We spent time with them to learn what outcomes they valued most. Their answer was clear. They still wanted us to provide technical courses that introduced students to ideas and technologies that help them solve business challenges. But they also wanted us to help technical professionals see themselves as leaders, and prepare to take on leadership responsibilities.

With that insight and tremendous industry support, we added three courses that spanned the graduate program. In this curriculum, students began with a base of self-awareness and a shared definition of effective leadership. They also conducted several self-assessments to better understand their potential. Through learning activities between each course, students developed plans for practicing leadership. Finally, they engaged in building team leadership skills, leading change, and broadening their understanding of global needs and challenges.

After nine years of experience with these graduates, tracking and monitoring their progress, coaching and advising them along the way, we have observed phenomenal growth on their part. They have made serious choices, and are challenging themselves

after graduation to go further with their leadership practices. Each person's story is unique—and all have found a path forward to making a contribution.

These students come from many different backgrounds: business, medicine, law, information technology, engineering and other technical backgrounds. They work in local, regional, national and global organizations. They are technical professionals at the forefront of the global economic challenge, and serve as a microcosm of technical professionals worldwide. This book shares their stories of exploration and discovery, and how they are meeting the challenges they experience in their own environments and in the broader world.

They have come to realize that leadership is not about their position or authority, but rather how they serve and engage with others. They now think of an effective leader as someone who motivates others to reach shared goals. And they realize it takes people at all levels and all capabilities to build strong and effective organizations. In this book, we share highlights of what they learned—and hope you find it equally inspiring.

### **About the Authors**

Between us, we have more than 80 years of combined experience in industry and academia. Elaine Millam has worked with students at all levels, from K-12 to graduate school, and spent many years in industry as an executive responsible for leadership development, and as a leadership coach. Ronald Bennett has extensive industry experience as an engineer, engineering executive, general manager and business-to-business sales executive, as an entrepreneur, and as a post-secondary educator and administrator. Our experiences and viewpoints converge on one key issue: the need to maximize the talents and skills of technical professionals.

We wrote this book to help you achieve your professional and personal goals. It is meant primarily for technical professionals, technical managers, students of science and engineering and others with education and experience in science, technology, engineering and mathematics.



Every idea in this book was tested in a wide range of organizations and industries by people like you; real people doing things that have led to extraordinary accomplishments and life changes. This book is about learning to think, feel, and act differently. It is about self-discovery, realizing that you already have most of what you need.

Not everyone wants to be a leader; we understand that. The concepts and experiences covered in this book will also help you recognize good leadership, and participate in ways that make a difference. We assume you are motivated to contribute—to help make the world a better place.

## **Invitation**

We invite you on a journey with the technical professionals who shared their experiences and perspectives with us. Read their stories of growth, learning, and development. Look for their challenges, trials, and moments of achievement. Imagine yourself in their places; consider what you would do, and why.

Review the testimonies of emerging leaders, and let them inform your leadership choices and plans. You can use the scenarios in this book in a process of self-discovery, leading toward your own vision of effective leadership.

In the appendix, along with useful tools and exercises, you will find our contact information. If you have questions or comments, we want to hear from you.

## Introduction

What goes into the making of your mindset? Have you ever stopped to consider what makes you think as you do? What does your inner voice tell you about yourself and your world? Do your beliefs keep you learning, seeking, and wanting to make a difference—or do they keep you from changing, growing, and letting go of the past? Whatever your history, you can still make a choice. Your mindset determines how you approach your life, and much of what happens in it.

As a technical professional in science, technology, engineering or mathematics, you have unique abilities and opportunities to make a difference in this world. Your background and training are needed to create solutions to the monumental challenges of this century and beyond. Consider this list and ask yourself, “What is mine to do?”

*Make solar energy economical*  
*Advance health informatics*  
*Manage the nitrogen cycle*  
*Prevent nuclear terror*  
*Provide access to clean water*  
*Provide energy from fusion*  
*Engineer better medicines*  
*Secure cyberspace*  
*Restore and improve urban infrastructure*  
*Reverse engineer the brain*

Beneath the emotional and political components of these issues are technical problems. As a technical professional, you have knowledge, skills and a point of view that are needed to solve them. To make a difference, you need leadership skills and attitude. That means recognizing your innate creativity, and combining it with the critical thinking skills that help you separate fact from fiction. We hope to capture your attention and spark your desire to make a difference.

Now is the time to invest in your future and position yourself as a leader. We want to help you develop a mindset that says, “I can and I will.”

## **Overview**

In this book, we share stories of emerging leaders and their experiences, and some critical information and tools that can help you, as a technical professional, reflect on your experience and decide what comes next.

Each of you has untapped leadership abilities. This book will help you find and develop your inner leader, become the person you want to be, and pursue your passions in ways that are productive and rewarding for you and others. We identify some common myths to help you recognize false assumptions. Then we help you identify your own leadership skills, show how you can make a real difference, and explain why the world needs your best professional self.

Each part of the book includes four chapters, with reflective questions at the end of each chapter. Take time to answer these questions for yourself. We promise that you will gain new insights to your thoughts, your mindset, and what is most important in your life.

**Part I—Exploding the Myths** will help you confront some of the mistaken beliefs our society has about leadership and technical professionals. We show how others have challenged each of these myths, and provide ways for you to let go of the mistaken beliefs that hold you back.

**Part II—Finding Your True Self** invites you to begin a self-assessment, discerning your strengths, talents, possibilities and potential. It encourages you to analyze your wants, needs, and desires—and then create a plan for developing yourself as a leader.

**Part III—Making a Difference** asks you to assess your professional responsibility and your obligation as a technical professional. It invites you to “be the change you wish to see in the world,” and provides tools and exercises to help you become just that.

**Part IV—Why the World Needs You** speaks again about the global demand for innovation, critical thinking, and systems thinking and functioning. It restates the

challenges of this century and beyond, showing why combined technical and leadership skills are so important.

## **Part I: Exploding the Myths**

This section uncovers and explodes 20 familiar myths that operate within our minds, our personal lives, our organizations, and our society.

In this book, a myth is not a parable from Mount Olympus; it's a commonly held misconception that restricts our imaginations and ambitions. Some are originally based in fact, although they have become less accurate over time. Others have never been true, but evolved from unrelated stories within our culture. They still affect workplaces and careers today.

As you read through these myths, think about which ones seem like beliefs. Follow the trail into your own past, and you can discover how those beliefs—those myths—have affected your thoughts and actions. You may realize where they began, and whether they are still relevant.

The first five myths keep us thinking that, as ordinary people, we cannot possibly lead others or make a significant difference. Other chapters will help you explore myths about yourself, leadership, families, organizations, and society. All myths start somewhere; some will stop here.

Myths are like gossip. Even though they are usually unfounded, they can be dangerous and damaging. They get in the way of clear thinking. By examining your beliefs, you can determine which beliefs remain real for you, and which are really myths.

Open inquiry and sound information will lead you to durable knowledge and solid judgments, all of which you will need to address the challenges ahead. Not everything can be proven, and you can't always have every detail you want to build a perfect case. But don't let the perfect become the enemy of the good.

Now that you've awakened to the basis of your beliefs, it's time to begin the real challenge—finding your true self. The next chapter will lead you through a process to do just that.

## **Part II: Finding Your Inner Leader**

This section invites the reader to look very closely at yourself as a starting place for your leadership journey. It investigates several questions including:

- What do you truly know about who you are?
- What is the truth about your beliefs, your strengths, your possibilities, and certainly your leadership potential?
- How have you come to know this about yourself?
- Who have been your teachers, mentors, and supporters who have helped you know you are competent, capable, and ready for leadership?
- How might you reconsider your dreams and your possibilities for your future?
- How do you continue to grow your self-awareness, as we know that is part of our ongoing growth and development process—the leader's journey?
- Who and how do you seek support to help us stay on our path of learning and leading?

This section requires that you undergo plenty of self-reflection and undertaking some serious activity to start first steps for your own roadmap ahead.

## **Part III: Making a Difference**

*“Something has to be done, and it's just pathetic that it is us that have to do it.”* Jerry Garcia

Almost everyone we have ever met has wanted to make a difference with her/his life. Who doesn't? We want things to be better for ourselves, our families, our communities, our organizations, our society and our world. Each of us may have different approaches and a different focus, but each wants to play a part. We all know there is an endless

supply of issues that need to be addressed, so there is no shortage of material to work with. As we discuss in the final chapter of this section, technical professionals have a particularly special and important role to play because of their technical expertise, professional responsibility and internal passion to make a difference.

In this section, we look first at “being the change we want to see in the world” and then allowing that to stimulate us into committing to doing our part through action learning, building our roadmap ahead and all the while ensuring that we stay balanced with reflection and action, as well build strong and healthy relationships.

## **Part IV: Why the World Needs You**

In this section, we discuss the broad societal need for science, technology, engineering and mathematics (STEM) professionals to hear and accept the call to address the big issues of this century. These people are uniquely qualified to lead in an increasingly technologically complex world. We describe the ethical obligation a scientist or engineer commits to, and what it means to take this obligation seriously. We look at the meaning of leadership and how it aligns with the needs of our future. We speak to the global demand for innovation and innovators, and show how scientists and engineers play key roles in leading the process. Finally, we explore the sustainability of leadership practice, and outline the way a leader with broadened perspectives can work collaboratively with others to bring about solutions for a world that needs them.

## **Conclusions**

The world needs you. There are big problems to solve in this century. As a technical professional, you have an important responsibility to help find better answers. You have the education, training, experience, and critical thinking skills needed to innovate and lead the creation of sustainable solutions. You cannot do this alone, so you also need to develop the leadership skills, attitudes, and actions necessary to engage others in the process.

Many of the critical issues we face will require technical solutions. But as Joe Ling pointed out, there are also emotional and political aspects to consider. To be effective in engaging others to assist, you need to develop an understanding and mastery of these aspects as well. Your continuing learning action plan should include knowledge of others' motivations and behaviors, building relationships and becoming a servant leader.

Before you can lead others, you need to know yourself thoroughly. Understanding your own true beliefs and passions will require reflection and exploration. This will be an adventure, and you won't know what you'll find until you've ventured to places in your mind that may have not been visited recently. You may discover things you don't like; you will likely also find some beliefs and passions that will bring you great joy. With this newfound self, you are prepared to develop your lifelong learning plan and roadmap, and set out on your leadership journey.

Where this journey will take you is a mystery at the beginning. It will probably lead to paths you didn't know existed. For example:

- You may discover great needs in your work organization that match with your passion, and step up to leadership with fresh ideas, building the relationships you need as you go and tapping into existing relationships that provide support.
- You may find needs in your local community that fit other passions, helping youngsters develop a love of learning, especially of science, technology, mathematics and engineering. This need may be in terms of technical depth, or of building technological literacy in those with other passions.

- Perhaps your role is to debunk misconceptions about science and technology. Notions that are unfounded but often repeated become assumed truths; sometimes they are the result of deliberate misinformation. Technical experts can respond with persuasive facts.
- As members of professional associations, you have the opportunity to take leadership roles and support the goals of those organizations. You may even help organizations re-evaluate and realign their goals.
- With your technical skills, understanding of your passions and newfound leadership skills, you may delve into public policy. Few members of our legislative bodies have technical backgrounds. To write good public policy, they need your expertise as an advisor—or perhaps as an elected peer.

Everything is changing rapidly. You may discover that you need to continue your education. There are many ways, formal and informal, to learn. Take advantage of those that fit you best.

Now that you know how to reflect and see the benefits, you will need to make time to continue reflection. Even your beliefs and passions will change, and you need to stay tuned to yourself.

Above all, think globally. The technical issues facing the world are global issues. Some may be even more critical in developing areas than where you live. Are you aware of these issues? Can you understand what they mean to the people living in those areas? What can you do to help? Are you doing it? Perhaps there are opportunities through your community, your religious organization, your professional association, or a local college or university to become engaged.

As a technical professional, you have the fundamental skill of critical thinking. Use your skill, specific technical knowledge, and ability to lead to have a positive impact in the world.



Think back to when you were young. Why did you pursue the path you have taken? Was there some large, underlying goal of helping people, solving technical problems or other form of making a difference? Now that you have all the tools identified, revisit your personal goals and answer the question: *What are you going to do to really make a difference?*

#### SOURCE FOR BOOK

The book 'Leadership for Engineers: The Magic of Mindset' can be obtained from AMAZON, either in print form or Kindle. The website for ordering the book is:

[http://www.amazon.com/s/ref=nb\\_sb\\_ss\\_i\\_0\\_24/186-4985209-4327753?url=search-alias%3Dstripbooks&field-keywords=leadership%20for%20engineers%20the%20magic%20of%20mindset&srefix=Leadership+for+Engineers%2Cstripbooks%2C258&rh=i%3Astripbooks%2Ck%3Aleadership%20for%20engineers%20the%20magic%20of%20mindset](http://www.amazon.com/s/ref=nb_sb_ss_i_0_24/186-4985209-4327753?url=search-alias%3Dstripbooks&field-keywords=leadership%20for%20engineers%20the%20magic%20of%20mindset&srefix=Leadership+for+Engineers%2Cstripbooks%2C258&rh=i%3Astripbooks%2Ck%3Aleadership%20for%20engineers%20the%20magic%20of%20mindset)