15 Fundamentals for Higher Performance in Software Development

Includes discussions on CMMI, Lean Six Sigma, Agile and SEMAT’s Essence Framework

Paul E. McMahon

Foreword by Scott Ambler
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This book is for sale at http://leanpub.com/15fundamentals

This version was published on 2014-07-17

ISBN 978-0-9904508-0-1

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Contents

Praise for 15 Fundamentals.................................................. i

Foreword by Scott Ambler .................................................. iv

Introduction ................................................................. 1
   The Problem And What This Book Is About ...................... 1
   My First Goal in this Book ............................................. 1
   About the Proposed Solution .......................................... 3
   How Performance (Process) Improvement Works Today ......... 3
   A Second Goal in Writing This Book and Why You Should Care . 4
   The Approach in this Book .............................................. 5
   A Third Goal of this Book ............................................. 6
   Summarizing the 15 Fundamentals and Thinking Framework Needs . 6
   Neuroscience, Human Decision-Making and the Stories in this Book . 12
   This Book is for You if... ............................................. 12
   About the Terms Process and Practice in This Book .......... 13

Part 1 – The Problem & The Start of a Solution .................. 14

Chapter One – The Sustainable Performance Dilemma .......... 15
   What Is Practice? ..................................................... 15
   Looking Back At Yesterday And At Business Today .......... 17
   You Can’t Sustain Performance Staying Where You Are ...... 18
   Patterns During Difficult Times .................................... 19
   The View of Practice in Many Organizations Today ........... 20
   Sustainment Training .................................................. 23
   Chapter One Summary Key Points ................................ 25
Praise for 15 Fundamentals...

“Paul McMahon has a refreshingly different approach to process improvement. It is based on sound theory, personal observations over a long career, and his participation in the groundbreaking SEMAT project. This book is a perfect counterpoint to the traditional improvement methods so often applied with CMMI, Six Sigma, and other improvement approaches. Read it and then wonder how you ever survived those other approaches.”

*Dr. Richard Turner, Co-Author of CMMI Survival Guide: Just Enough Process Improvement*

“Many efforts have been made to capture the enormous breadth and depth of knowledge and practices necessary to improve organizational performance. Until now, these efforts have either woefully lacked for substance or completeness. More likely, other efforts simply gave up on the fantasy of being complete and settled for a focus on a tiny subset of what’s needed to be said. Through masterful architecting of ideas, Paul’s *15 Fundamentals for Higher Performance in Software Development* offers a readily digestible framework to provide both substance and completeness to a very large, complex and important subject.”

*Hillel Glazer, Author, High Performance Operations, CMMI High Maturity Lead Appraiser*

“Paul has done a great job looking at a wide spectrum of prevalent software methods, without a bias for or against any, and come up with a few practical tips for a sustained performance improvement. If you are short of time or don’t know where to start the book, jump to the 15 fundamentals. They are worth their weight in gold.”

*Prabhakar R. Karve, Director of Engineering, Impetus*

“I very much like the ‘out of the box’ approach. The book exemplifies high maturity thinking in a simple way. There is a need for this book because people are always looking for examples of high maturity thinking.”

*Winifred Menezes, CMMI High Maturity Lead Appraiser*
“This book gave me insight into other ways to improve and lay the foundation for CMMI Level 4 and 5; a foundation to last and expand.”

Dr. Michael Oakes, Process Improvement Lead, Alion Science and Technology, A CMMI Development and Services Level 3 Organization

“I am one of those people that Paul refers to in the preface of this book who are turned off and have tuned out when it comes to the multitude of process and performance improvement approaches along with their related hype and buzzwords. So the first thing that hit me when Paul asked me to review this book was ‘oh no! not another buzzword and tool!’ But in going through it, it really hung together. This actually struck home with me because this Essence framework introduces a lot more context with regard to problem solving. And again this upset me because I wanted to scream at someone for introducing another tool and I couldn’t.”

John Troy, Program Manager Rockwell-Collins

“Congratulations on producing a really valuable piece of work. Clearly the product of many years’ worth of serious application. The book reveals the essence of improving software development performance by teaching us to take ownership for improvement and focusing on patterns to address repeating, specific, weaknesses.”

Barry Myburgh, Johannesburg Centre for Software Engineering(JCSE), School of Electrical and Information Engineering, University of the Witwatersrand, Johannesburg, South Africa

“We have spent about 100 years applying scientific management. Until now we just do our job without knowing why we are doing it. We know what we are doing when we pay attention but not when we don’t pay attention and it is in those times that our efforts come undone. This is the thrust of a lot of this book.”

Dr. Tom McBride, University of Technology, Sydney, Australia
“The material addresses how to apply principles and practices to control the Complex Adaptive System that we call our organization. SEMAT provides structure to control development and sufficient freedom to leverage the creativity from within the organization, to meet your objectives. If individuals take the time to “think” about how to improve and their team understands “why” they are performing an activity; the leader and the team should be able to adopt and extend the SEMAT framework to address their desired ‘productivity’ performance goals.”

Bob Epps, Lockheed Martin Corporate Engineering and Technology

“If you are a software practitioner and serious golfer (or athlete), and are looking for advice on how to continuously improve your professional and personal performances, this book is for you. It encompasses 40 years of Paul’s experience on how to practice to get to the next level of excellence, both at work and on the green.”

Dr. Cecile Peraire, Carnegie Mellon University, Silicon Valley Campus
Foreword by Scott Ambler

The goal of a foreword is to help you to determine whether or not you want to invest your time reading this book. Some people read forewords but I suspect many do not. You apparently are one of those few people who read forewords. Good for you.

A few years ago I saw Watts Humphrey speak about PSP, TSP, and CMM/CMMI at an agile conference. After his keynote we had a chance to break bread and discuss how CMM(I) had worked out in practice. Watts told me that he felt that the CMMI community had badly gone off the rails, given many pushes by large service providers who were primarily interested in getting as much money out of the US Federal government as they possibly could. Worse yet, these service providers were aided and abetted by a systemic culture within their customers that rewarded following procedures rather than doing what it takes to deliver real value to their stakeholders. Watts lamented that this was exactly opposite of what he had envisioned for CMM(I). He also recognized that the agile community not only understood what was really important they also had a viable strategy for achieving that goal. He saw the need for the CMMI community to embrace agile. This was in 2004.

I first met Paul at the inaugural SEMAT meeting in Zurich in the spring of 2010. Going into the meeting I knew about three quarters of the people involved, although Paul was one of several people new to me. During one of the breaks we introduced ourselves to each other and started up a conversation. To be honest, my first thought was “Great, another CMMI zealot who wouldn’t know what a clue was unless it was documented, reviewed, watered down, reviewed again, and then finally accepted by a committee several months later.” But then I listened to him. He had real world experience making CMMI work in practice, often overcoming the well-meaning CMMI true believers whose primary desire was to define and then enforcerepeatable processes instead of producing repeatable results. His experiences and opinions were very similar to what Watt’s had shared with me, and his observations about CMMI implementations were very similar to my own. More importantly, it was clear to me that Paul had earned his seat at the SEMAT table. Almost immediately after the SEMAT meeting I read Paul’s book, “Integrating CMMI and Agile Development,” and confirmed that he was a true pragmatist.
Fast forward to the Autumn of 2013. Paul contacts me and asks me to be a technical reviewer of the manuscript of his latest book, this one. In this book Paul provides important insight for succeeding at improving your software engineering processes. Although there is a plethora of great advice in this book, four of Paul’s insights struck me as important for achieving lasting process improvement.

First, he rightfully questions the effectiveness of many CMMI implementations. Although this book is about far more than CMMI, I believe that it’s critical that we listen to, think about, and then act on the criticisms that Paul shares with us. Paul has worked in the CMMI trenches for years and clearly cares about helping organizations who are on the CMMI path to improve their effectiveness. I have worked with several organizations claiming to be CMMI Level 5 compliant and have been consistently appalled by the wastefulness of their approaches despite their claims to the contrary.

Second, I was struck by his idea of first and second level checks. First level checks are very lean in nature in that they are non-intrusive, support rapid feedback, and support continual small corrections. The goal is to sense, and rapidly correct, commonly repeating weaknesses. Second-level checks enable you to assess whether you are achieving the intended results. These checks should also have a rapid feedback loop to ensure that timely actions are taken. I suspect that you will find that Paul’s advice about first and second level checks are easily actionable within your organization.

Third, I found Paul’s insights around measurement to be very pragmatic. In particular, his observation that you are often better off analyzing the data that you already have is critical. You have a limited process improvement budget, if you have one at all, so you want to invest it wisely. Investing in more measures, when you likely have a lot of data you aren’t yet leveraging, is wasteful. Modern development and operations tools, including open source ones, often generate usage data that can be analyzed and reported on using business intelligence dashboard technology. In fact, this is a strategy called development intelligence in the Disciplined Agile Delivery (DAD) framework.

Fourth, Paul promotes what is effectively a Kaizen-based approach of small changes. This is a strategy that the lean community has promoted for years, Once you have achieved your performance objectives you have to keep making small changes, and you need a mechanism in place to rapidly sense the effects of those small changes, and rapidly respond to those effects to minimize performance impact.
My fear is that many agile transformations in the enterprise space will fail. They will fail because they ignore Paul’s advice. When you’re transitioning to agile the hardest part is evolving your culture, and unfortunately many enterprises have built a culture for themselves that is almost the exact opposite of agile. This is particularly true in CMMI environments.

Should you read this book? If you are interested in software process improvement, if you are responsible for an agile transformation effort, or if you are an IT professional who wants to get better at what they do, then I also think the answer is a resounding yes. In short, Paul has written another great one.

Scott Ambler, May 2014

Co-Author of *Disciplined Agile Delivery: A Practitioner’s Guide to Agile Software Delivery in the Enterprise*

ScottAmbler.com
Introduction

The Problem And What This Book Is About

For the past forty years I have been helping high technology organizations in their quest to improve and keep ahead of the competition. During this time I observed millions of dollars spent annually on process improvement initiatives that too frequently fell short of their intended mark. Due at least in part to this situation, today many are turned off and have tuned out when it comes to the multitude of process and performance improvement approaches along with their related hype and buzzwords. Agile [1], CMMI [2], Kanban [3], Lean [4], Six Sigma [5], Lean Six Sigma [6], PSP [7], and TSP [8] to name just a few. We have taken a simple idea and made it far too complex and in so doing have lost the spirit and intent of performance improvement. I have also observed common patterns associated with these past efforts which can shed light on how we can do better at the process of getting better in the future.

My First Goal in this Book

My first goal in this book is to explain why we are facing these problems and how you can get yourself and your organization back on track focused on the things that matter most to both your own personal performance and your organization’s performance. This book is equally about personal and organizational performance.

More About the Problem

Part of the problem we face has been caused by a gap that exists between the theory of performance improvement and the way that theory is being implemented today. As an example, today many organizations that use the CMMI– specifically the high maturity practices– have fallen short of achieving the high value sustainable performance improvements sought [9]. By high value I mean those improvements that address pain points that hurt us the most when we need our performance to be at
its best. I am using the CMMI as an example here, but the data presented is reflective of other performance improvement models as well, including Lean Six Sigma [10], and Agile Retrospectives [11], as will be discussed.

Figure Intro-1 demonstrates the improvement theory underlying the CMMI, alongside what some organizations have actually experienced [12]. I emphasize the word some because there is also growing evidence indicating high maturity practices can reduce cost. [13] Our focus here is on those organizations experiencing difficulties reaping the most valuable benefits from their performance improvement investments, regardless of their improvement approach. I highlight CMMI High Maturity practices because the intent of these practices is to help organizations improve performance and sustain those improvements.

The graph on the left in the referenced figure demonstrates the theory that as CMMI maturity rises so should productivity. Experience beyond level 3 in some organizations is the reverse.

Is theory underlying CMMI wrong?

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maturity rises cost should decrease (this assumes the same quality/defect level in the resultant product). The graph on the right demonstrates that after level 3 cost actually rises in some organizations thus degrading, rather than improving, performance. This data was originally provided by a Senior Manager in a CMMI Level 5 organization and there are numerous other sources available supporting similar experiences [14, 15, 16]. This leads to a question:

*Is the theory underlying the CMMI wrong?*

It is my contention that the theory is not wrong, but as an industry we have not done a good job of translating theory to practice. Or, in other words, we have not done a good job of explaining the theory in simple enough terms so it can be applied easily to everyday situations faced by professionals on the job. Stated another way, the increase in cost observed in the diagram reflects poor CMMI implementation, rather than an error in the CMMI model.

**About the Proposed Solution**

To achieve high value sustainable performance improvements in the current technology environment we need a culture shift in how performance improvement is viewed and implemented. Organizations need to take a lesson from how great performers really get better at what they do and apply it within their own business context.

Today many organizations use documented process descriptions, comprehensive formal training, and extensive studies and pilot projects to help their people get better at doing their job. While these techniques can help achieve a level of proficiency, historically they have fallen short at helping us achieve and sustain our most valuable potential improvements taking us beyond fundamentals.

**How Performance (Process) Improvement Works Today**

Often a process ² improvement effort in an organization begins by assigning a small group of employees to the task. The first pattern I have observed is that this group is

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²The focus of this book is performance improvement. Process improvement is a means to that end.
usually secluded from the stakeholders who must eventually use the improvement. This is not wrong. Change must be carefully managed so it does not disrupt critical on-going business. But too often the major portion of these improvement investments is expended by people working the effort in isolation from those intended to receive the help. High value sustainable improvement can only result when those who must perform can utilize the improvement in solving their daily challenges. I have also observed many of these efforts in organizations leading to a cycle that seems to move from one fad to the next with little sustainable improvement over time to show for the effort expended.

If you work in a large corporation, these observations may not surprise you, but have you given much thought to why these patterns occur, and what could be done differently leading to a more sustainable positive result?

In the book “Talent is Overrated: What Really Separates World-Class Performers from Everybody Else” [17] the author explores how world class performers move their performance to much higher levels than most people ever achieve through what the author calls “deliberate practice”. “Deliberate practice” is not what most of us were taught about practice when we were young. It is highly demanding mentally, and it is not fun.

A Second Goal in Writing This Book and Why You Should Care

In Chapter One of this book I begin the investigation into what it takes to achieve high value sustainable performance improvement by discussing in more detail the concept of deliberate practice and how it has helped world class performers such as Jerry Rice⁴, and Bill Gates. But this book is not about how to become another Jerry Rice or Bill Gates.

On the personal side, this is a book that can show you how to get just a little bit better at whatever you want to get better at regardless of your current performance

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³When I use the phrase “sustainable improvement” I mean improvements that last without reverting to old behaviors.
⁴Jerry Rice is a retired American Football wide receiver who is generally considered to be one of the greatest players in National Football League history.
level, and it will show you how to sustain that performance improvement once you have achieved it.

On the business side, organizational process and performance improvements can be broadly grouped into two categories: Technology and major organizational changes looking to the future, and smaller changes that can help practitioners every day.

A second goal in this book is to present the case that the speed of change we are all witnessing in today’s world requires a rebalancing of how organizations view and prioritize their process and performance improvement initiatives across these two broad categories.

This may not sound like a very big goal for a book, but think about what it would mean to you and your organization if everyone just got a little better at what they did today, and tomorrow everyone got a little bit better again.

This book provides practical techniques that have been proven to help individuals and organizations get better and sustain their performance improvements into the future.

**The Approach in this Book**

Before we jump into the material, let me tell you a little about the approach I took in developing the book. This book is not about any specific performance improvement approach, but it does discuss many popular approaches including the CMMI, Lean Six Sigma, and Agile Retrospectives. My approach is to highlight fifteen (15) fundamentals I have observed common to all successful improvement efforts where sustainable high value performance improvements are achieved. These fundamentals too often get missed by organizations and individuals trying to improve and sustain their improvements.

The intent is not to focus on, or dive too deep into, any specific improvement approach, but to highlight what is common across all of them with respect to the essentials of effective performance improvement.

In this book I share real examples from both my own consulting experiences, a personal performance improvement experience, and stories from high performing athletes and musicians to help you think about performance improvement outside-the-box.
A Third Goal of this Book

A third goal of this book is to share a vision for a framework that can help counter the patterns that may be holding you and your organization back. I am not talking about yet another buzzword, method, or new tool to hype, but rather a simple thinking framework that can help keep you and your organization focused on the fundamentals too often missed.

Summarizing the 15 Fundamentals and Thinking Framework Needs

Below you will find a summary of the 15 fundamentals and the related thinking framework needs in support of each fundamental. In order not to distract the reader from the main flow of the book I have chosen to make observations about this framework in sidebars (noted by “Framework Vision”) in Parts I and II of the book. In these sidebars I explain the framework’s key characteristics, rationale for the characteristics, and connection to the fundamentals.

In Part III of the book I share an example of such a framework that holds promise and I explain how this framework may be able to help organizations achieve and sustain the higher performance they seek.

Fundamental One:

Training is about helping people understand expectations related to a job. Practice helps you actually do your job, and learn to repeat how you do it, and continue to do it well even under difficult and often unanticipated conditions.

Related Thinking Framework Need: Our framework envisions practices as living entities reflecting what people actually do. With our vision your practices are built as extensions to a set of essentials that have been widely agreed upon.

Learning to perform a practice effectively requires more than just acquiring knowledge about our processes. It also requires an understanding of the context we must
perform within and it requires that we learn how to make rapid and effective decisions that fit within a specific context. Thus, our framework must support these real world needs.

**Fundamental Two:**

We each have tendencies toward repeating specific weaknesses, and experience has shown they are often the largest obstacle people and organizations face when trying to sustain higher levels of performance. A critical first step toward sustaining higher performance is to locate areas that contain critical repeating specific weaknesses that hinder your personal or your organization’s performance.

Related Thinking Framework Need: A key difference with our framework vision from what has been done in the past can be summed up in the phrase “separation of concerns”.

Our goal is to separate the essentials (e.g. what all successful projects should focus on) from extensions (e.g. specific practices, such as those needed to address a specific situation or weakness).

The rationale for this goal is to simplify the management of practices for individuals, and teams allowing them to keep their specific practices up to date reflecting their specific needs based on their specific situation, without having to worry about whether their changes are jeopardizing the essentials, that we all need to be constantly focusing on.

**Fundamental Three:**

One of the best ways to keep people motivated and interested in their work throughout their career is to involve them in their own continuous improvement.

Related Thinking Framework Need: Our framework vision places the professional in charge of their own practices, supports them in identify where changes are needed, and empowers them to make those needed changes. Some fear this approach believing that project pressures may lead personnel to make poor decisions degrading
rather than improving their practices. This is one of the reasons why separation of concerns is so important. Separating the essentials from specific practice extensions ensures the essentials are never lost as we make changes to improve and sustain our higher performance.

**Fundamental Four:**
You have to figure out your own repeating specific weaknesses if you are to gain the benefits and achieve your own sustainable higher performance.

Related Thinking Framework Need: While each organization must locate their own unique repeating trouble spots, our vision includes a framework that can help organizations by guiding them to consider areas where trouble has most often been found in the past.

**Fundamental Five:**
You should always, as individuals, reduce the number of areas you are focusing on at any one time to between three and seven, ideally closer to three. Organizations can have more, but this should not increase the focus of individual performers.

Related Thinking Framework Need: Our vision stresses that all changes to your way of working should be accomplished incrementally in small steps supporting fundamental five.

**Fundamental Six:**
When selecting areas to measure ensure you have done sufficient analysis (e.g. following real threads) to know you understand the real context and there is high likelihood of findings that will lead to improved performance in the reasonably near future.

Related Thinking Framework Need: Our framework needs to be a “thinking framework” in the sense that it helps individuals and teams make better decisions related
to small timely changes by providing the team with objective data they can use to support their decisions.

**Fundamental Seven:**

Some of the most significant impacts to performance start out as seemingly little things that we often fail to notice until it becomes too late to correct.

Related Thinking Framework Need: Helping practitioners make tough choices where they don’t have enough time to do everything may be the most valuable area where our thinking framework can benefit our teams.

**Fundamental Eight:**

When you’ve been doing something wrong for an extended period, the right way may feel wrong for a period of time while you are adjusting to the change.

Related Thinking Framework Need: We envision the framework helping most at the start of a project (e.g. preparation steps). If the project runs smoothly, its value may diminish as the project proceeds. On the other hand, if the project starts to run into trouble, the value of the framework rapidly rises.

This is because the framework is a monitoring aid. You can liken it to a good referee in a sporting event. In well played games good referees are often not noticed. Their value becomes clear when the trouble starts.

**Fundamental Nine:**

Collecting more and more samples of the same data won’t help an organization improve or sustain higher performance.

Related Thinking Framework Need: The framework will remind the team where they are and where they need to focus their effort next.
**Fundamental Ten:**
Often the best path to high value performance improvements, especially when you have a limited process improvement budget, is to spend less time collecting data, and more time analyzing what data you have collected, and then using the results of that analysis to keep refining your resolution and measurements to ensure you are moving in the right direction.

Related Thinking Framework Need: You may decide there are other important things you work with that you want to monitor and progress, beyond the essentials defined within the framework. Therefore the framework will allow you to add your own important things to monitor and progress.

**Fundamental Eleven:**
Just following a process isn’t enough to sustain high performance. It must be the right process that addresses the real goal.

Related Thinking Framework Need: The framework will not magically give you answers to all your challenges, but it will provide a practical and simple way to rapidly remind people what is most important to be focusing on right now, and it will provide a structure under which you can add more specific information to help you find your own answers to your challenges.

The rationale for this framework need is based on the observation that too often practitioners are faced with too much work on their plate and they often need help in deciding where the priority should be placed.

**Fundamental Twelve:**
Even if we know it makes sense to practice, it won’t help if we don’t discipline ourselves to do it consistently at the right time.

Related Thinking Framework Need: The framework must be easy to access, use and update as practitioners learn new things interacting with their teammates each day on the job.
Introduction

The rationale for this framework need is based on the observation that if it isn’t easy to access, use and update, it simply won’t be used by busy practitioners.

**Fundamental Thirteen:**

Once you have achieved your performance objectives you have to keep making small changes, and you need a mechanism in place to rapidly sense the effects of those small changes, and rapidly respond to those effects to minimize performance impact.

Related Thinking Framework Need: The framework supports fundamental thirteen by placing practitioners in control of their own practices and giving them a mechanism to keep their practices current with the information they need to continue to maintain high performance.

**Fundamental Fourteen:**

The most valuable performance improvements often involve situations that seem to defy resolution because there is no quick fix, but we know they are critical to our performance and we know there is no way to work around them so we must continually deal with them head on.

Related Thinking Framework Need: The framework will provide reminders to practitioners of common situations they should be alert to, and possible options and consequences to potential related decisions.

**Fundamental Fifteen:**

Just knowing what is happening isn’t enough to keep it from happening again. You must practice continually at just the right time with the right objective and contextual data, if you really want to make the changes necessary to sustain higher performance.

Related Thinking Framework Need: The framework will focus on the most important things we work with. It will help our teams assess their progress in a consistent agreed to way reminding them when they need to rapidly respond with a change.
Neuroscience, Human Decision-Making and the Stories in this Book

Today through recent breakthroughs in neuroscience we understand more clearly how human decision-making occurs \[19, 20\], and through the stories in this book you will learn how to leverage this new information about decision-making to help the performance of your people and your organization.

This Book is for You if...

You are an organizational leader, process improvement professional or software or systems practitioner and...

- you believe there is no single best approach to performance improvement.\(^5\)
- you believe the best approach to performance improvement includes conscious thought and clear decision-making integrated into every team and practitioner’s way of working.
- you want to learn why many performance improvement efforts fall short of their goals so you can avoid similar pitfalls.
- you are interested in learning fundamentals that are common to all successful improvement approaches, but are often missed.
- you are ready to do some out-of-the-box thinking related to the performance improvement problem we all face today.
- you are interested in improving both your own personal and your organization’s performance.
- you are interested in seeing practical and easy to understand examples of high maturity thinking (although some may be non-traditional) that can bridge traditional and agile approaches.
- you are interested in learning about proven techniques that can help both your organization’s performance and your practitioner’s performance.
- you believe the best path to high value sustainable performance improvements is incremental, continuous and must involve practitioners in a more active way than what most organizations have done in the past.

\(^5\)For a cross-reference of CMMI, Lean Six Sigma, and Agile, specific topics in this book refer to the Appendices.
About the Terms Process and Practice in This Book

The CMMI defines the term “process” as “a set of interrelated activities which transform inputs into outputs to achieve a given purpose.” The term process has historically been associated with the written description of the process. Some organizations use the term practices the same way. That is they view their “practices” as a description of how they would like their people to behave. But the practices (or processes) that an organization actually follows may not be written down. They may be tacitly known and followed by the people in the organization. In this book when I use the term “practice” or “process” as a noun I mean it to include both types—written and tacit.

When I use the term practice as a verb, I mean the activity of rehearsing your practices. Do you think you need to rehearse your practices to gain the potential high value payback? Or do you think you just need to be given a little training in your practices before you follow them for real and then you will naturally get better through experience alone?

If you believe that preparing is important before you perform, then how should you go about doing it, when should you do it, and how much of it should you do, if you want to maximize a high value payback for your effort? These are questions that rest at the core of the subject matter in this book.
Part 1 – The Problem & The Start of a Solution
Chapter One – The Sustainable Performance Dilemma

“Out of intense complexities, intense simplicities emerge.” Winston Churchill

When I was young my goal was to become the world’s greatest golfer. In the summer time my father would take me very early every morning to a small nine hole golf course in Windsor, New York. I would stand out on the far side of Route 79 from where the first hole was situated and hit golf balls to the other side of the road. It was not uncommon for me to hit 200 golf balls before nine in the morning. Then I would practice putting and chipping for an hour before heading out to play nine holes. In the afternoon I would repeat the entire cycle.

I had been taught if you want to get better you had to practice long and hard. There was no big secret to it. The harder you practiced the better your chance for success. That was what I was taught, and that was what I believed then. Today I no longer believe it, and if I knew then what I know now about high value performance improvements I believe I would have had a much better chance of achieving my goal.

What Is Practice?

We all know what practice is, or at least we think we do. It’s what athletes and musicians do. Right? In the book “Talent is Overrated”[17] the author, Geoff Colvin, describes what practice used to mean to him as follows: “When I practice golf, I go to the driving range and get two big buckets of balls. I pick my spot, put down my bag of clubs, and tip over one of the buckets. I read somewhere that you should warm up with short irons, so I take out an 8 or 9 iron and start hitting. I also read somewhere that you should always have a target, so I pick one of the “fake” greens out on the range and aim for it, though I am not really sure how far away it is. As I work through the short irons, middle irons, long irons, and driver, I hit quite a few bad shots. My usual reaction is to hit another ball as quickly as possible in hopes that it will be a decent
shot, and then I can forget about the bad one. Occasionally I realize that I should stop to think about why the shot was bad. There seems to be about five thousand things you can do wrong when hitting a golf ball, so I pick one of them and work on it a bit, convincing myself that I can sense improvement, until I hit another bad one, at which point I figure I should probably also work on another one of the five thousand things. Not long thereafter the two buckets of balls are gone and I head back to the clubhouse, very much looking forward to playing an actual game of golf, and feeling virtuous for having practiced. But in truth I have no justification for feeling virtuous. Whatever it was I was doing out on the range, and regardless of whether I call it practice, it hasn’t accomplished a thing.”

Framework Vision: View of practice

Historically, many organizations have viewed their practices as static descriptions of the way they would like their people to operate. Over time, because people constantly learn new and better ways to do their job, a growing gap has resulted between these “practice descriptions”, or “shelf-ware” and what people actually do on the job. Our framework vision takes a different view of practices. We envision practices as living entities reflecting what people actually do rather than what someone thinks people should do. With this vision your practices are built as extensions to a base of knowledge that has been widely agreed upon. While this vision may sound ideal, we also understand that in the real world, learning to perform a practice effectively requires more than just acquiring knowledge about our practices (or processes). It also requires an understanding of the context we must perform within and it requires that we learn how to make rapid and effective decisions that fit within a specific context. Thus, our framework must support these real world needs as well.

Does this sound like what you think practice is? Colvin discusses how great performers such as Jerry Rice, and Bill Gates achieved greatness by practicing in a different way that he calls “deliberate” practice. Deliberate practice has the following characteristics:

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6“Talent Is Overrated,” by Geoff Colvin, page 65
• It is designed specifically to improve performance
• It can be repeated a lot
• Feedback is continuously available
• It is highly demanding mentally
• It isn’t much fun

When I read those characteristics I wasn’t surprised. They sound more like what I was brought up to believe about practice than what Colvin had described his view of practice had been. I was taught you had to dedicate yourself to your practice. You had to totally commit yourself to your practice everyday giving it everything you had from sunrise to sunset. And you needed to keep doing it even when your body wanted to stop. That is what I believed and that is what I did, but it didn’t work for me. It wasn’t enough to sustain my continued performance improvement. Besides failing to achieve my performance goals, when I was about twenty years old I stopped playing golf altogether and I didn’t play the game again for almost thirty years.

Looking Back At Yesterday And At Business Today

I believe there were many factors involved in why my hard work didn’t lead to achieving my golf goal. When I would spend long days practicing I frequently became tired in the late afternoon and found it difficult to keep my mind on what I was doing. But since I was taught that practice isn’t suppose to always be fun I would keep hitting balls. Often as a result my golf swing would actually degrade and by the end of the day I would be hitting the ball worse than when I started early that morning. I felt like I was on a yo-yo, seeing improvement for a period, followed by loss of improvement. While progress was clearly evident in my early years, over time I reached a point where it seemed that the more I practiced the less value I was getting out of it and the more frustrated I became.

Today in business I see similarities to this cycle where organizations improve to a certain level and then hit a downward period even though they might still be working hard at trying to get better [9]. There are usually multiple factors involved
as to why this pattern occurs, but my observation in many organizations is that sustainable improvement beyond a fundamental capability is not implemented effectively and therefore is rarely achieved. I find this to be true even in CMMI Level 5 organizations which are supposedly continuously improving their processes and hopefully demonstrating valuable performance improvements as a result [21]. While it is natural to expect a degree of up and down cycles, I believe the impact of the downward cycle in many organizations is far greater than what many may realize.

You Can’t Sustain Performance Staying Where You Are

One of the most common misunderstandings about performance relates to what it takes to maintain a specific performance level. You can’t sustain your current performance by doing nothing about improvement. This is not well understood. Without working improvements you will lose ground. This is because the environment in which you operate never stays the same. Personnel may come and go. Projects end, others start. With the passage of time, if nothing else changes people forget things they use to know.

The specific factors that cause loss of capability will differ in each organization, but loss always occurs and it is almost always more costly than many realize. An observation I made both with organizations and individuals with respect to loss of capability is that over time there are performance patterns that tend to repeat. Once you understand these repeating patterns for a given organization, or individual, you can start to predict what lies ahead. More importantly to our purpose here, you can also learn how to change the pattern so your losses are mitigated and offset by improvements that allow you to continually sustain higher performance in the future.

Most people understand that process improvement and training are important. But many don’t understand how effective sustainable performance is developed and maintained in an organization. Where this becomes most evident is in the decisions made when the business is in one of its normal down cycles showing signs of trouble. For example, when sales are slipping, or when projects are behind schedule.
It is often under these conditions where the benefits of your most recent process improvement efforts could potentially be realized and be of most help to you. But this is what is most often missed. This is because many don’t understand how high value sustainable performance improvements are attained and nurtured.

If you look at the athletes who most often achieve success you will find they are the ones who are best prepared because they trained in conditions similar to (or more difficult than) those in which they must perform during competition. The best athletes seek out the most difficult conditions in which to practice and improve their performance. Runners who practice in cool weather wither on race day when the temperature turns hot. West Coast professional baseball teams rarely perform well when they head East for the World Series in cold October. Successful performers seek out adverse conditions in which to practice because they know these conditions provide the optimum environment to prepare to perform at their best.

But unfortunately rather than greet the difficult conditions when they arrive in business as an opportunity to help personnel learn to perform at their best, we find more often these are the conditions under which investments in people most often dry up. There are, of course, reasons why this happens. For example, an organization’s motivation to improve performance may change over time because of changing business conditions. But should changing business conditions cause us to lose our motivation to improve, or just refocus us on the high value areas given the current environment? This will be discussed further, along with what you can do to sustain your motivation, as we move forward in the book.

**Patterns During Difficult Times**

I observe repeating patterns in each organization I am asked to help. Faced with a crisis, in some organizations project management becomes engaged driving a solution. One pattern I have commonly seen, however, is for management to become overly engaged in the solution resulting in a lack of leadership and guidance deep in the organization during the crisis.

In other organizations engineering takes the reigns in times of trouble driving a solution from the technical side. A common pattern I have learned to be on the look out for in strong engineering organizations has been a loss of cost and schedule accountability during these times of high technical focus.
During times of crisis organizations that have recently instituted improvements to solve common weaknesses often revert to old habits leading to loss of performance—rather than looking to the crisis as an opportunity to apply the new behavior to gain high value performance benefits.

The manner in which process improvement is viewed and managed in most organizations today supports this backward mentality. This is because of the way process improvements are most often implemented today as distinct and segregated efforts from real projects. This makes them easy targets for elimination in these situations where they could potentially provide their greatest benefit. But when such decisions are made do we understand the consequences not just to potential future improvements, but to those investments previously made and to our current on-going critical projects?

Observing these common patterns has led me to ask questions related to what effective sustainable performance requires, and this investigation has led back to the notion of practice—but not the kind of practice I learned in my youth, nor the kind attributed to the success of our superstars, like Gates or Rice.

**The View of Practice in Many Organizations Today**

When we think of someone needing to practice a subconscious thought many of us have is the need to practice implies a lack of competency. For athletes or musicians practice does not bring this negative connotation. We accept that getting better for them is a noble goal. We understand you can always get better as a musician, or an athlete and if you don’t practice we know you won’t perform as well as you could during the next game or performance.

But why do we take a different view when it comes to people in the business world? This same idea of needing to practice to ensure you are ready to do your best on the next project, or the next phase of the current project, or even the next day of the current project doesn’t usually sit so well with the way we think. In fact, in business the idea of practice takes on more of a negative connotation. Rather than look upon practice as something that improves performance in the business world we tend to think that if someone needs to practice then:
"I don’t want them doing it on my project because I want someone who already knows how to do the job”.

The thinking for some reason in business becomes either you are qualified to do the job, or you are unqualified. We don’t tend to think in terms of always being able to perform at one’s best by practicing in the context of work. But why should there be any difference?

In fact in business practicing on the job is likely to be discouraged because it may mean if you are trying to do it better tomorrow you are risking doing it right today. We don’t want to take that risk. This has historically been one of the prime reasons why deploying process improvements in the business world is often resisted. While our top athletes and musicians are constantly working to get better even right up to a few moments before a big game or performance, in business we avoid change fearing loss of performance rather than recognizing the great potential opportunity it could bring.

One of the arguments I often hear is that we send people to training so they shouldn’t need to practice on the job. But this line of reasoning assumes that the purpose of training and practice are one and the same. This misses a fundamental value of practice that training does not provide.

**Fundamental One:**

Training is about helping people understand expectations related to a job. Practice helps you actually do your job, and learn to repeat how you do it, and continue to do it well even under difficult and often unanticipated conditions.

Practice under adverse conditions is required to help us learn to do a job in the environment we will actually have to face when performing that job. Today in business because practicing “on-the-job” is discouraged we often don’t get to practice at all for the real world conditions we are asked to operate in. As a result—like the runner who practices in cool weather and then must face sweltering heat on race day—we are not prepared and time and time again fall short in sustaining our most valuable potential performance improvements when they could help us the most.
Starting To Discover A Different Kind of Practice

When I first began to think about a better way to conduct performance improvement efforts, and if it might tie to practice, I was working with a successful growing organization helping them deploy formal training of some recently improved processes. While they liked the formal training there always seemed to be people who missed the scheduled training because it was only offered at certain times. We also received feedback that while the training was good, there were frequently issues on projects that people didn’t know how to handle. These were often very specific issues such as when and how a certain type of risk should be raised to senior management, or how to handle a specific subcontractor issue, or a specific customer issue.

Often the answer to these specific issues being raised was actually in the training material, but it required an interpretation on how to apply a fundamental practice [22]⁷ we had previously taught to a very specific situation. This was something we found many people required additional help doing.

Framework Vision: What’s different?

Helping people handle the different real situations that arise on the job is itself a process improvement. It is also one of the best ways to aid real on the job performance. Unfortunately, it isn’t viewed this way in many organizations. Once the fundamental process is defined with basic training, organizational investment in that process often dries up. What makes this so unfortunate is that the investment stops just at the point where the potential performance improvement starts. This is why in organization’s that use the CMMI framework stopping at CMMI Level 3 (basic processes defined) is not a wise business investment. Level 3 means you have a base from which you can start serious performance improvement efforts. What is different in our vision is that we do not try to separate process (or practice) definition from practice improvement and practice evolution. Improvement is continuous and integral to practice execution. This is a fundamental difference that is necessary to achieve real sustainable performance.

⁷Disciplined Agile Delivery (DAD) talks about addressing process goals, not following practices. The idea is that your team will do so in a way that reflects the situation they face. Refer to http://disciplinedagiledelivery.wordpress.com/2013/07/17/exploring-initial-scope-on-disciplined-agile-teams/ and http://disciplinedagiledelivery.wordpress.com/2013/01/21/disciplined-agilists-take-a-goal-driven-approach/
Sustainment Training

Because these situations were arising frequently one of the managers suggested that we consider holding shorter, less formal, and more frequent sessions that came to be called Sustainment Training sessions. The idea of sustainment training wasn’t that it provided new training, but it was refresher training for just key issues that were reoccurring where people needed reminders, and could get specific questions answered. They needed help, and in some cases they needed specific guidance on scenarios that were specific to their projects. These sustainment training sessions I came to view more like “practice” than formal training.

We were repeating principles and practices that we had already taught, but we were going much deeper into “how-to” apply the principles and practices by looking at actual scenarios that were occurring on real projects and then considering different options and consequences to handle each.

These sustainment training sessions proved to be extremely popular in helping people deal with the actual situations that were arising on their project. The sustainment training we implemented had some similarities to Colvin’s “deliberate practice” and some distinct differences. Sustainment training was similar to “deliberate practice” in that:

- It was designed specifically to improve performance by taking into consideration the real situations people were facing everyday specific to their projects
- It can be repeated a lot and we found it needed to be repeated a lot because without repeating it, it became too easy for people to forget or just not to see the connection between the practice scenario and their real project situation
- Feedback was continuously available because we started holding these sessions more and more frequently opening them up for anyone to just stop by during their lunch break to get some quick feedback, and reinforcement

Sustainment practice was also different from “deliberate practice” in that:

- It didn’t take long and therefore wasn’t demanding from a time perspective
- It was fun, because we made it fun. It became a period for sharing across groups which improved morale in the company.
More and more people just started bringing their lunch and attending to listen even if they didn’t have questions. They looked forward to these mid-day sharing experiences.

When I think back to my youth, I thought I was practicing the right way to get better at golf. But my practice wasn’t effective and it didn’t feel right. I knew there must be a better way to get better, but I didn’t know what it was, and I didn’t know how to go about finding it.
Chapter One Summary Key Points

• You can’t sustain your current performance by doing nothing about improvement.
• Training is about helping people understand how to do a job.
• Practice helps you apply that training, and continue to apply it even under stressful conditions.
• Helping people handle the different real situations that arise on the job is itself a process improvement. It is also one of the best ways to provide high value assistance to performers on the job.
• CMMI Level 3 means you have a base from which you can start serious performance improvement efforts. Too few organizations actually understand and do this.
• Deliberate practice characteristics
  – It is designed specifically to improve performance
  – It can be repeated a lot
  – Feedback is continuously available
  – It is highly demanding mentally
  – It isn’t much fun
• Sustainment training similarities to deliberate practice
  – Designed specifically to improve performance
  – It can be repeated a lot
  – Feedback is continuously available
• Sustainment training differences from deliberate practice
  – It doesn’t take long
  – It is fun
References


3 Anderson, David, Kanban: Successful Evolutionary Change for Your Technology Business, Blue Hole Press, 2010


5 Eckes, George, Six Sigma for Everyone, John Wiley, 2003

6 George, Mike, Rowlands, Dave, Kastle, Bill, What is Lean Six Sigma?, McGraw-Hill, 2004

7 Humphrey, Watts, A Discipline for Software Engineering, Addison-Wesley, 1995

8 Humphrey, Watts, TSP: Coaching Development Teams, Addison-Wesley, 2006

9 Glazer, Hillel, CMMI Failure Modes and Solutions – Paving the Path for Agile & CMMI Interoperability


10 Wall Street Journal, Where Process Improvement Projects Often Go Wrong

http://online.wsj.com/news/articles/SB10001424052748703298004574457471313938130

11 Stafford, Jan, What’s Behind the Backlash Against Agile?

http://searchsoftwarequality.techtarget.com/feature/Agile-development-Whats-behind-the-backlash-against-Agile?

References

(Data originally provided by a Senior Manager in a CMMI Level 5 organization)

13 Reifer, Don, Profiles of CMMI Level 5 Organizations, Crosstalk, January, 2007

14 Where Process Improvement Project Go Wrong, Wall Street Journal,
http://online.wsj.com/news/articles/SB10001424052748703298004574457471313938130

15 Avoiding Catastrophic Failures in Process Improvement, Harvard Business Review,

16 Avoiding Process Improvement Pitfalls,
http://c-spin.net/cspin20080110-AvoidPitfalls.pdf

17 Colvin, Geoff, Talent is Overrated: What Really Separates World Class Performers From Everybody Else, Portfolio, 2008

18 Intentionally left blank

19 Kahneman, Daniel, Thinking Fast and Slow, Farrar, Straus, and Giroux, April, 2013

20 Lehrer, Jonah, How We Decide, Houghton, Miflin, Harcourt, Jan, 2010

21 McMahon, Paul Can I be CMMI Level 5 and Agile Too? (audio), www.pemsystems.com


23 McMahon, Paul, Integrating CMMI and Agile Development: Case Studies and Proven Techniques For Faster Performance Improvement, Addison-Wesley, 2010


25 The Magical Number Seven Plus or Minus Two
http://en.wikipedia.org/wiki/The_Magical_Number_Seven_Plus_Or_Minus_Two

26 Benson, Jim, DeMaria Barry, Tonianne, Personal Kanban: Mapping Work, Navigating Life, Create Space, 2011


29 Brooks, Fred, The Mythical Man-month, Addison-Wesley, 1972

30 Putnam, Lawrence, Myers, Ware, Measures For Excellence: Reliable Software On Time, Within Budget, Yourdon Press, 1992

31 McMahon, Paul, Uncommon Techniques for Growing Effective Managers
http://www.pemsystems.com/pdf/Grow_Eff_Mgr_Crosstalk_Update2.pdf,

32 McMahon, Paul, Growing Effective Technical Managers, Presentation at the Systems & Software Technology Conference in Salt Lake City, Utah, 2003

33 Swenson, Keith, Mastering the Unpredictable: How Adaptive Case Management Will Revolutionize the Way That Knowledge Workers Get Things Done, Meghan-Kiffer Press, 2010

34 Kennedy, Michael, Product Development for the Lean Enterprise: Why Toyota’s System is Four Times More Productive and How You Can Implement It, The OakLea Press, 2003


36 Intentionally left blank


39 Myburgh, Barry, Towards Understanding the Relationship Between Process Capability and Enterprise Flexibility, Third South African National Conference on software process establishment, assessment and improvement, 2005

40 Patterson, Kerry, Grenny, Joseph, McMillan, Ron, Switzer, Al, Crucial Conversations: Tools for talking when stakes are high, McGraw-Hill 2002

41 Ambler, Scott, Goal Diagrams,
http://disciplinedagiledelivery.com/


46 The British Psychological Society, There is nothing more practical than a good theory


49 Hale, Craig, Rowe, Mike, Do Not Get Out of Control: Achieving Real-time Quality and Performance, Crosstalk, Jan, 2012


52 http://en.wikipedia.org/wiki/SEMAT


56 Jacobson, Ivar, Ng Pan-Wei, McMahon, Paul, Spence, Ian, Lidman, Svante, The Essence of Software Engineering: Applying the SEMAT kernel, Addison-Wesley, Jan, 2013

57 Cohn, Mike, Agile Estimating and Planning, Prentice-Hall, 2006


61 Parker, John L, Again to Carthage, Scribner, 2010

62 Parker, John L, Once a Runner, 1978, Scribner Reprint, 2010