Six Sigma Golf

How To Improve Your Golf Game

by

Jay Arthur

Upgrade Your KnowWare!

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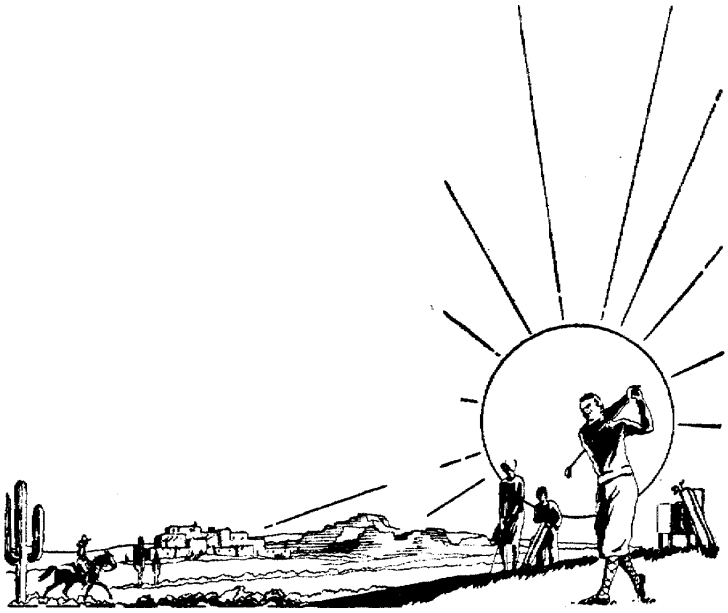


Contents

Preface

Recently I read Dave Pelz's *Putting and Short Game Bibles*. I was surprised by the similarities between his approach to improving your golf game and the skills of Six Sigma—the breakthrough improvement strategy many businesses are using to plug the leaks in their cash flow

In Chapter 10, Pelz focuses on the "improvement process"; how to improve your putting. Here are the five steps:

1. **Focus** on the part of your game that's causing the problem. "You can practice, develop, and improve the wrong aspect of your putting (that is, an aspect that is not causing your problem) for the rest of your life and you'll never putt any better"
2. **Measure your misses** to determine if there is a *pattern* to them (left, right, long or short).
3. **Analyze your misses** to find your prescription for improvement. What changes will deliver the improvements you desire. "While working hard on the right problem will almost always produce improvement, working hard on the wrong thing usually makes things worse."
4. **Improve by doing it**
   ("I mean do it properly 20,000 times").
5. **Measure and monitor your progress.**

Sound familiar? This is the essence of the Six Sigma problem solving process (DMAIC): Define, Measure, Analyze, Improve, and Control your business "misses."

The rest of this book will explore how to use the tools of Six Sigma to improve your golf game. It will also provide a good overview of Six Sigma and the lessons you can transfer to your business.

The Game of Golf

Most people think golf is a silly game until they try to play it. There's only 14 clubs, 18 holes and one ball, but would so many people be playing it if there weren't great lessons to be learned?

Golf teaches you how to set goals (ball in hole) and achieve them, no matter how many strokes it takes. Fewer strokes reduces the mental and physical cost. Every missed shot involves some kind of waste (penalty strokes for out of bounds or unplayable lie) or rework (pitch back to the fairway from behind a tree, chip or bunker shot when you miss the green, or three-putt).

The secret to reducing your score is the development of simple, consistent preshot routines and swings for the long, short, and putting games. While we are often amazed by the creativity of Tiger Woods and Phil Michelson around the green, they wouldn't need those flop shots and 3-wood chips if they hadn't missed the green.

Golf is played in rounds.You always end up where you started, hopefully wiser for the experience. This mirrors the cycles of business improvement, ever spiraling upward in the search for something transcendent.

Now for the bad news:

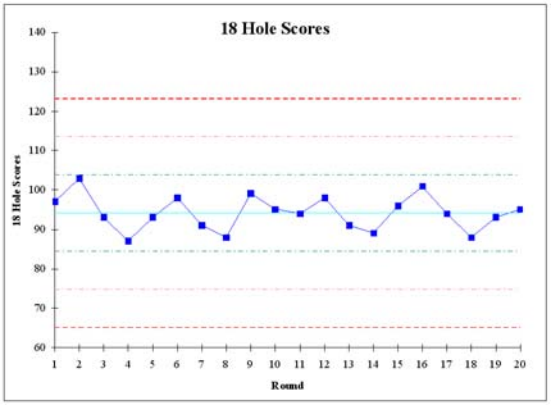
- 90% of golfers never break 100!
- 66% of all shots occur within 100 yards of the hole
- **80% of all shots lost to par occur within 100 yards of the hole!**
- 50% of lost shots are putts longer than five feet.

In Six Sigma for business:

- 90% of businesses never break 4-sigma.
- 80% of the mistakes and costs are caused by 20% of the processes.
- 50% of the mistakes and costs are caused by only 4% of the processes.

Measurement

Scoring in golf involves minimizing the number of strokes and penalties involved in getting from tee to holeYour final score is the ultimate measure of how well you played. So the first measure would be your 18 hole score for each round you play. Since the number of strokes are counted (i.e., attribute data), you can use a c or a u chart to plot your performance:



Six Sigma uses control charts to monitor performance over time. Control charts can help you spot unstable conditions and help you accurately predict the performance of any process in terms of time and defects.

While you or I might get upset with a 101 and elated with an 87, this chart shows that our golf performance is stable and predictable with an average of about 95. This means that there's no real reason to get upset with a 101 or elated with an 87; they are just normal variations in our play

In business, instead of strokes per round, you could just as easily measure the number of errors per invoice or the number of scratches on a paint job.You might measure the number of commitments or due dates missed.

While your final score is important, how can you measure your game to determine where best to make improvements? This requires only a few key measures in golf:

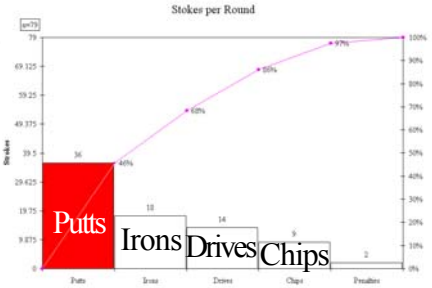
- **Drives** (fairways hit/missed)
- **Irons** (greens hit/missed)
- **Short Game** (chips, pitches, bunkers) to within eight feet.
- **Putts** (sunk/missed)
- **Penalties** (unplayable lie, lost ball, out of bounds, etc.)

Just thinking about these shots, it should be clear that:

1. **Drives only occur on par 4 or 5 holes.** The number of drives should be less than 18.
2. **Irons are used on almost every hole.** Irons should account for a little over 18 strokes per game.
3. **The number of pitches, chips, or bunker shots increase with the number of missed greens.**
4. **The goal for putting is two putts per green (total 36).** Dave Pelz suggests that more than one three-putt per round is an indicator of a need to improve your putting.
5. Penalty strokes are symptoms of a wide variety of difficulties that plague golfers.

If you look at these generic statistics, you'll find a startling pareto pattern: The putter*alone* performs half the strokes.

Strokes	Type	Clubs
36	Putts	1
18	Irons	7
14	Drives	3
09	Chips	3
02	Penalties	



The pareto chart is a key Six Sigma tool to help laser focus your improvement efforts. The "big bar" at the left tells you where to focus your improvement efforts. What "big bar" should you be focusing on in your business?

Checksheet

One of the easiest ways to track your misses is with a checksheet. Golf courses make this easy because they provide scorecards carefully designed with plenty of boxes.

If you think about what you want to measure, it's easy to use your scorecard to track key measures during your round. When you hit a drive, you want to know if it's left, right, or in the fairway. Then, whether you're focusing on your irons, short game, or putting, you'll want to know if the ball ends up long or short, left or right of the hole.

Hint: Focus on one part of your game at a time.

So just use your card to create a checksheet. Use a small dot to indicate the location of the hole. Then put a mark for each shot. You will begin to see patterns in your play that might otherwise go unnoticed:

	1	2	3	4	5	6	7	8	9	Out
	10	11	12	13	14	15	16	17	18	In

	Left	Center	Right
Drives	𝍸	𝍸	𝍸

	Left	Center	Right
Long			𝍸
Center		●	𝍸
Short		𝍸	

The same is true in business; count your misses. Where is your pain? Customer complaints? Order errors? Billing errors? Missed commitments? Count them and figure out where they cluster.

Variation

Golf is not a game of perfect.. - Dr. Bob Rotella

One of the key concepts of Six Sigma involves the reduction of variation, but what is variation? You know that if you hit two golf balls in a row with seemingly the same club using the same stance, swing and grip that there is no way that the two balls will fly through exactly the same bit of air and land in exactly the same place.

Why not? Variation! There are subtle differences in your breathing, pulse, stance, and swing, let alone the wind blowing across the fairway.

So why do you bother going to the driving range? To find ways to reduce the amount variation in your swing that will produce more fairways and greens hit in regulation. Every miss may well cost you another stroke.

You can never be in the same place twice in relation to the target. - Michael Murphy

Even if you play the same course, there are differences in humidity, temperature, and wind that affect the ball's flight. Sometimes the rough is long, sometimes short. Sometimes it's wetter, sometimes drier. Sometimes the ball is above your feet, sometimes below. Greens are faster or slower. Sometimes your adrenaline is up; sometimes it's down. Sometimes your mind is elsewhere on personal or work problems. All of these factors can cause variation in how you play the game.

For every shot, you pick a target and aim for it. And you know that the farther the ball lands from your target the greater the cost in terms of strokes. And it's not just a linear cost; the cost increases exponentially with the length of your miss.

The same is true in business; subtle differences can cause wide variation in your ability to deliver what customers want when they want it. The bigger the variation, the greater the cost.

The goal of every drive is to put the ball in the fairway. This means that the left and right edge of the fairway are the upper and lower specification limits (USL, LSL) of a histogram. Six Sigma uses histograms to show variation in your data.

If your drives are too spread out, you need to reduce the spread (variation) of your drives to improve your score.

If your drives land consistently right or left , you can adjust your aim to bring them back into the fairway

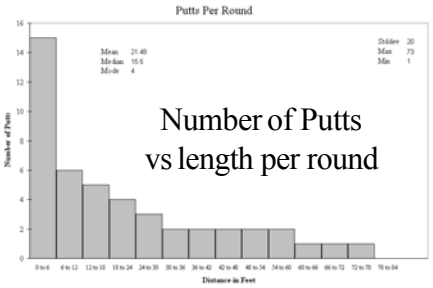
How can you reduce the variation in your business?

The Putting Game

"While most golfers think that the drive from the tee and the next shot to the green comprise the game of golf, what they don't understand is that they will probably make two, three, or four more scoring shots before finishing the hole."

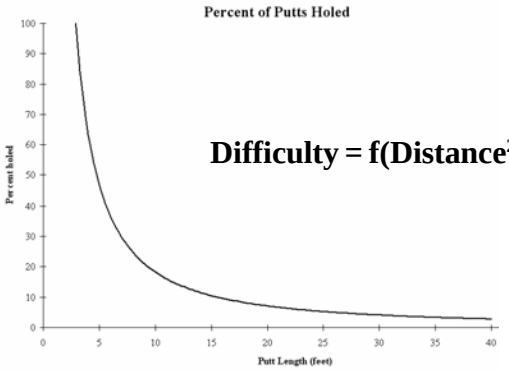
If you want to improve your score then you'll want to improve your putting game. Based on Dave Pelz's data, here's the putting success rate of pros and amateurs:

Distance Feet()	Pros	Amateurs
2	100%	100%
3	90%	
5	65%	50%
6	50%	
10	25%	
15+	10%	



Number of Putts vs length per round

Notice that the pros have a slight edge. They make two-thirds of the five footers compared to the amateur's one-half. The pros also lag putts closer to the hole than amateurs do giving them shorter second putts. This can give you some idea of the power of the slight edge.



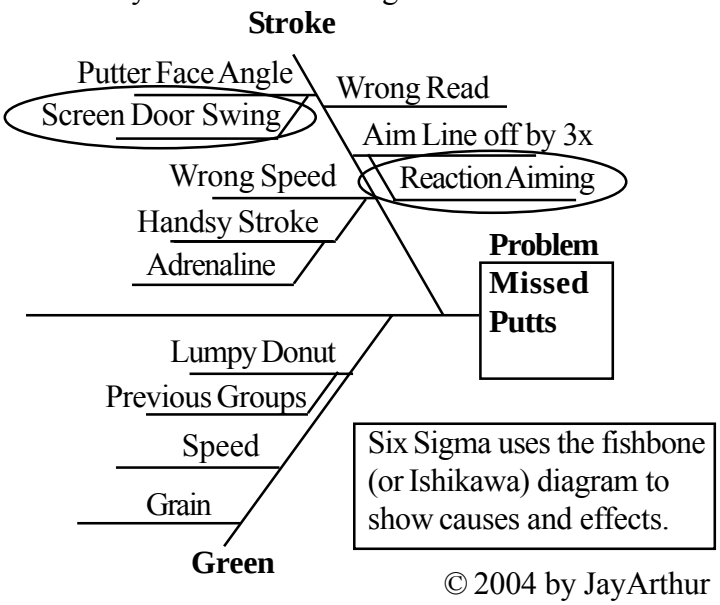
Difficulty = f(Distance^2)

What's the slight edge in your business that could translate into an expanded bottom line?

Root Causes

When Pelz looks at the data about why golfers miss putts, here's what he found:

- **Putter face angle can affect direction by 83%.** The "screen door" (arc) swing produces more face angle variation than a straight back and through swing.
- **Stroke angle only affects 17% of direction**
- **Most players *under read* putts by a factor of 3.** Why? Because at the peak of its arc toward the hole, the ball is only one-third of the distance toward the true aim line. *You only see one-third of the true break!* The subconscious changes your stance and swing to compensate for the conscious mind's delusions, but the calculations are more complex than a simple straight-back and straight-through putt on the true aim line. So, you get more variation.
  Tip: Count the number of putts missed above (A) and below (B) the hole. Is there a pattern? Putts that miss below the hole are like putts that are too short. They have no chance to go in.



Solutions

1. Simpler is better.

The pure, in-line, club face square, dead hands, pendulum swing is the simplest, most repeatable and accurate putting stroke.

- **Dead hands**—no wrist movement.
- **Arms swing like a pendulum** with a slight rotation of the shoulders (never the arms).
- **Ball slightly forward in your stance** to reduce bouncing and ensure a straighter roll.

Tip: Practice your stroke indoors on a flat surface about 80% of the time, then take it out to a putting green.

2. True Aim Line

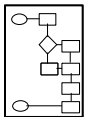
Over-read the break, because visible break is only one-third of the true break. If you consistently miss the ball below the hole on breaking putts, start adjusting your aim line. Triple it.

3. Speed

The slower the ball rolls, the more it breaks. Pelz suggests 17 inches past the hole is the optimal "speed" for making *all* putts. Worst case, this will leave you with a makeable short putt.

4. Preshot Routine

A consistent preshot routine will get you "in the mood."



In Six Sigma, you can use a flow chart to describe your processes or routines. The goal of "lean" Six Sigma is to reduce the delays in the whole process. Pelz suggests that the time between your practice stroke and actual stroke be no more than eight seconds so that you won't lose the muscle memory

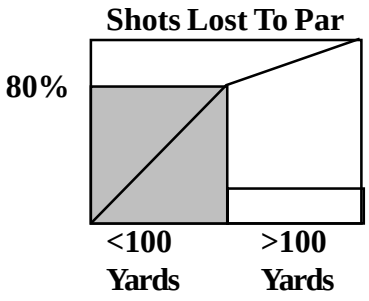
What delays can you eliminate in your business?

The Short Game

If you want to improve your score then you'll want to improve your short game. Based on Dave Pelz's data:

80% of all shots lost to par occur within 100 yards of the hole!

Sound familiar? This is Pareto's 80/20 rule.



Of course a wayward tee shot can cost you a stroke, but if you count the strokes lost to par and their causes, you'll find that most are inside 100 yards.

The higher your handicap, the more short game shots you will have per round. PGA players miss five greens per round while the 10-handicapper misses ten. A 20-handicapper may miss all 14 of the par 3s and 4s. Then add four for the par 5s and you're looking at 14-20 pitches, chips, and bunker shots per round.

Most golfers can make 100% of putts within two feet of the hole. But the average golfer only makes 50% of putts five feet away and 10% of putts over 15 feet away

To improve your score, you will want to put the ball within eight feet of the hole. That's why you need a good short game.

The same is true in business: What part of your business causes 80% of the errors? Count your "misses" and develop a pareto chart to focus the improvement.

Root Causes

Pelz data suggests that short shots that leave putts over eight feet in length should be considered a "miss." There are two main contributors to missed short shots:

1. How you hit the shot
2. How the ball reacts when it lands

How You Hit The Shot

Cardinal Rule: Hit the golf ball before you hit the earth.

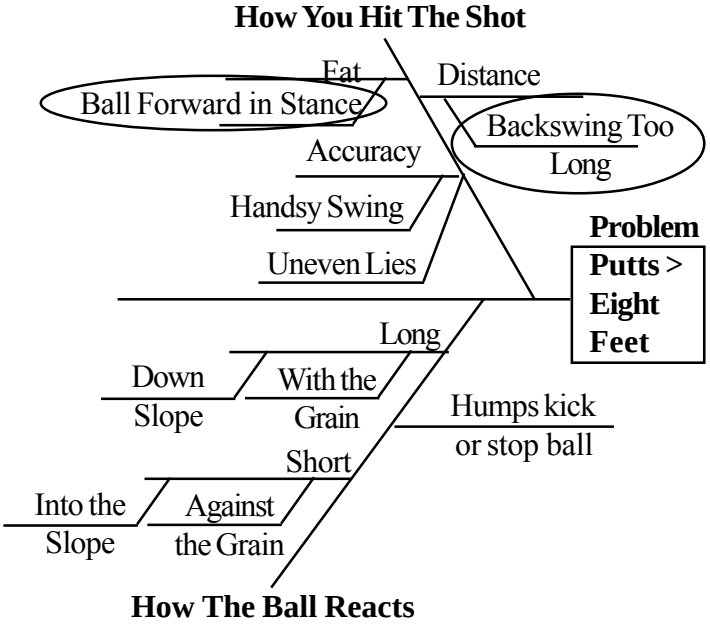
Lower loft = straighter bounce = greater accuracy

Higher loft increases the chance for face angle errors and lower accuracy.

How The Ball Reacts

Short game shots often bounce and roll for more than half their total distance.

Landing area affects roll. Humps magnify errors (long or short) and valleys minimize errors.



Solutions

Distance (30-100 yards)

1. Develop three consistent swings that are less than a full swing: quarter, half and three-quarter swing. Pelz calls these the 7:30, 9:00, and 10:30 swings. Imagine that your left arm is the big hand on the clock. Take it back to 7:30 (45 degrees), 9:00 (90 degrees) and 10:30 (135 degrees) and then swing all the way through to a full finish. Pelz found that the 9:00 swing was the easiest to learn, and the most consistent and reliable.

The 10:30 swing will produce a shot 10 yards shorter than a full swing. A 9:00 shot will go 75% of the distance. And a 7:30 will go 50% of the distance.

2. Measure the distance that each of these three swings produce using all of your wedges. Mark these distances on your wedges.

Pitches (inside 30 yards)

Pitches are done the same way with a 7:30 take away and 3:00 finish.

Loft affects the roll.

- Pitching Wedge will roll as far as it carries.
- Sand Wedge will roll 2/3s as far as it carries.
- Lob Wedge will roll 1/2 as far as it carries.

Chips (just off the green)

1. Put the ball off your right heel.

2. Use dead hands (no wrist motion)

Putts

The most reliable way to play short shots from good lies is putting. If there's no reason not to putt from off the green, use your putter.

The same is true in business: What consistent methods can you use to satisfy your customers given short lead times and limited resources?

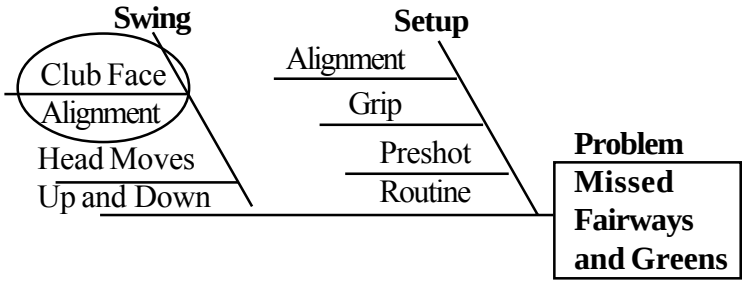
The Full Swing

Think about your golf game. When you're hitting your woods or irons, you pretty much know how far they are going to travel. The big problem is getting them to land accurately where you aim them. Intuitively, this makes sense doesn't it?

Dave Pelz found the same pattern: "Players were very good at controlling distance but very poor at controlling direction." Watch the pros and you'll see that everyone misses fairways and five or more greens per round.

Root Cause

With a consistent swing, you can change the distance by changing clubs. But even slight changes in the alignment of the face of the club or swing plane (inside or outside) can produce significant variation over the flight of the ball.



The secret to the full swing: improve your accuracy.

Track your misses (checksheet).
Is there a pattern (left or right, long or short)?
Change your setup and swing to correct it.

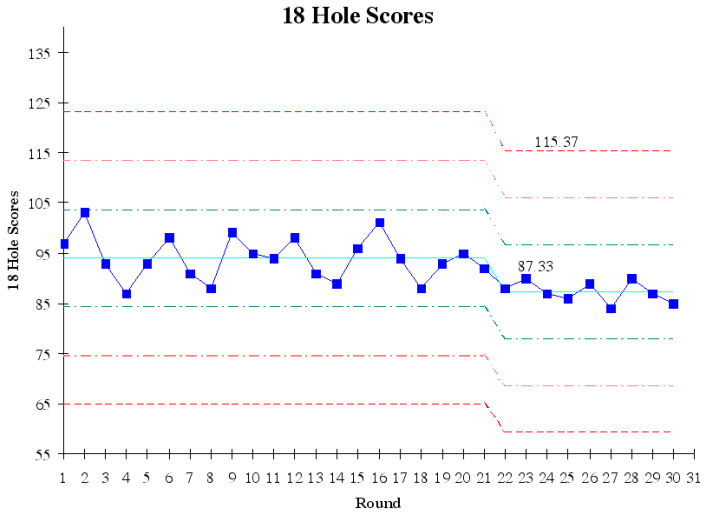
The same is true in business:

- Count your misses (control chart)
- Analyze the pattern (pareto chart and fishbone)
- Improve the process

Did You Really Improve?

Using a control chart, it's pretty simple to tell when you've actually improved. Your scores will decrease and then stabilize at a new level. There are a few rules that control charts use to identify changes. Sometimes these are unstable conditions and sometimes they show improvement. Eight scores in a row below your previous average demonstrate a process shift.

As you can see in this example, the average score has fallen by almost six strokes.



Goals

Each element of the golf game requires a different objective:

- **Putts—**hit the ball as accurately as possible with a gentle enough swing to go past the hole no more than 17 inches (Pelz found that 17 inches is the optimal "speed" to keep the putt on line through the hole).

- **Short Game—**hit the ball as accurately as possible with just enough power to land the ball as close to the hole as possible making your first putt "imminently holeable."

  The short game involves pitches, chips, and bunker shots with a variety of adjustable "finesse" swings.

- **Irons**—hit the ball as accurately as possible. Most players know how far they can hit a 7-iron. Distance isn't a problem; accuracy is.

  Drives and irons involve full power swings.

- **Drives—**hit the ball as far as possible within the constraints of accuracy. I love to watch the PGA players bomb a drive 300+ yards, but the farther you hit it the greater the cost of initial variation.

Insights

1. Control your long game distance using club selection.
2. Control your short game distance using wedge selection and swing length.
3. Control your putting distance using swing length.
4 Accuracy is largely controlled by how square the club face is at impact.

Mind Game

Before taking any shot, a golfer must pick out the smallest possible target. From inside 100 yards, think about holing the shot. - Dr. Bob Rotella

All the pros I've talked to imagine the actual trajectory they want the ball to follow before striking it. - Marilyn MacKenzie

When I first started to play, I took lessons. The golf pro taught me how to stand, grip the club, and make those first few awkward swings. Eventually I learned how to get the club head to find the ball and send it in a forward direction.

Jack Nicklaus says that playing well is 90% mental and 10% swing. I don't remember my golf pro teaching me anything about the other 90% of the game. I was reminded of this when I went to the practice range to hit my first bucket of balls this spring.

After you've played golf for a while, you realize that the ball will go toward a target you select or go just about anywhere if you don't pick a target. Standing on the range, I teed up a ball, picked a tree behind the driving range as my target and imagined the ball flying toward the tree and then just let my muscle memory do the work. The ball sailed toward the tree.

I managed to do this three times in a row before I got a little cocky, forgot to pick my target and imagine the ball's flight, and sent the next ball slicing right out of the range entirely. Such is the power of imagination and attention.

Imagination

Strong images are like seeds in our soul. Put forth streamers of heart power for the ball to fly on.
- Shivas Irons

Whether it's your favorite sport, career, or relationship, are you expending too much energy on the "swing" and not

enough on the "mental" aspect of success? It's so easy to get bogged down in the specifics of everyday life that we forget to imagine the future we desire.

What will it look like, sound like, and feel like to have the result you want?

Attention

When you hit a golf ball, you can't be thinking about something else. Before and after the shot you can be thinking about anything you want.

Relax

One of the things you discover playing golf is that getting angry or tense only sabotages your game. Your muscles tense up and you make more mistakes, not less. The more relaxed you are, the better your swing.

Golf Course Management

Just because Tiger Woods can bomb a drive doesn't mean that he always chooses the driver. Sometimes he chooses a 3-wood or an iron to keep the ball in the fairway when the driver might put him in trouble.

Success

So, if you want to be more successful:

1. Imagine the results you desire in every aspect of your life. Success is 90% mental and 10% swing.
2. Focus your attention when you're working on your goals. Eliminate distractions.
3. Relax. Anxiety rarely produces a good swing.
4. Manage your risks. Hit two safe shots instead of one risky one.
5. The ball always goes in the hole if you keep moving it forward.

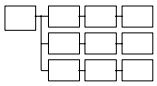
Six Sigma

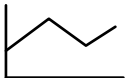
Step 1 - Focus

Factory
Fix-it: Defects + Delay = Cost
Main: Quality + Speed = Profit

Tools

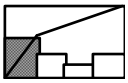
Tree Diagram





Line Graph

Pareto Chart



4-50 Rule

Cost of Quality

Step 2 - Improve

Quality

Root Cause Analysis (Why, Why, Why?)

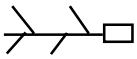
Speed

Value Analysis (Where?)

Hint: It's the Arrows

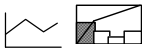
Tools

Fishbone (Ishikawa)



Flow Chart

Countermeasures
Verify Root Causes
Line Graph
Pareto Chart



Value-Added Worksheet

F I
H S

Step 4 - Honor

Recognize, Review, Refocus

What did we do right?

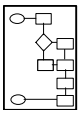
Where else can we apply what we've learned?

What's next?

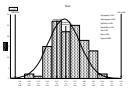
Step 3 - Sustain

Monitor and Sustain New Levels of Performance in Mission Critical Systems

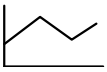
Tools



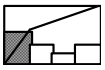
Histogram (Capability)



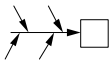
Key Tools



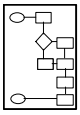
Line Graph: Show data trends over time. The Y-axis (left) shows the defects, time, cost and the X-axis (bottom) shows time (minute, hour, day, week, etc.).



Pareto Chart: Focus the improvement effort by identifying the 20% (vital few) of the contributors that create 80% of the time delay, defects, or costs in any process.

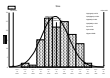


Cause-Effect: Systematically analyze the root causes of problems It begins with major causes and works backward to root causes.

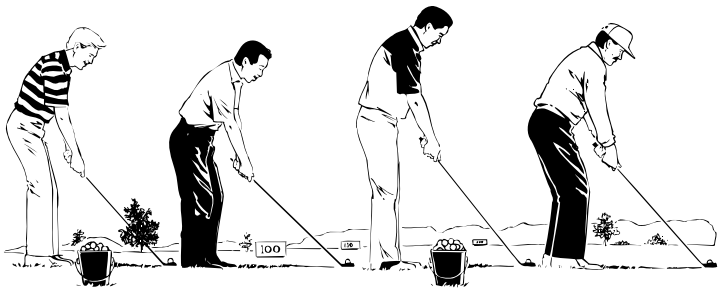


Flowchart: Show the flow of work through a process including all activities, decisions, and measurement points.

Control Chart: Help analyze, sustain, and monitor the current levels of process *stability* and to identify key issues for problem solving or root cause analysis.



Histogram: Determine the *capability* (i.e., the level of performance the customers can consistently expect) of the process and the distribution of measurable data.



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	1	2	3	4	5	6	7	8	9	Out
	10	11	12	13	14	15	16	17	18	In

	Left	Center	Right
Drives			

	Left	Center	Right
Long			
Center		●	
Short			

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Use these cards to track your accuracy.

1. Select one part of your game to measure (start with the worst first)—irons, short game, or putting. Write this into the box above the word "Long".
2. Put a stroke in one box (long, short, or center; left, right, or center) for each shot.
    - Irons (center is within 8 feet of the hole)
    - Short Game (center is within 8 feet of the hole)
    - Putting (center is 17" past the hole)
3. Evaluate your patterns. What do you need to improve?

	1	2	3	4	5	6	7	8	9	Out
	10	11	12	13	14	15	16	17	18	In

	Left	Center	Right
Drives			

	Left	Center	Right
Long			
Center		●	
Short			