

# Certiably Improving Quality Professionals

by Bill Hooper with Megan Schmidt

## At a Glance . . .

- Bill Hooper is an ASQ Certified Quality Engineer (CQE), Certified Reliability Engineer (CRE), Certified Manager of Quality/Organizational Excellence (CMQ/OE), Certified Six Sigma Black Belt (CSSBB), Certified Six Sigma Master Black Belt (CSSMBB), and an ASQ senior member.
- Bill's involvement in his ASQ section helped him discover his passion for teaching. His unique teaching style—which includes analogies, card tricks, and juggling—has helped more than 75 people receive ASQ certification. Bill said 95 percent of his former students have passed their certification exams.
- He dispels popular wisdom that “those who can, do; those who can't, teach.” Bill says teaching has helped him become a better practitioner, with his own process improvement project savings in the multimillions.

To this day, the kitchen table is still often thought of as the center of family communication, designed to encourage conversation and strengthen bonds among loved ones over a meal. Often, the fondest of memories are formed there.

But at Bill Hooper's house, the kitchen table is also a place to learn about statistical process improvement approaches.

In 2005, Bill had just received his third ASQ certification, the Certified Reliability Engineer (CRE). As someone who understood the challenges and rewards of pursuing certification, Bill decided to volunteer as a tutor to his peers that were experiencing difficulties passing the exams through his ASQ Michiana Section.

Many years had passed since he had last taught—not since teaching a basic statistical process control course in 1998 that he says was “less than ideal.”

But from the moment Bill began tutoring his first ASQ section pupil, Karen, he began to realize that maybe teaching is his call to service in supporting the quality cause.

Since 2005, Bill has taught various certification bodies of knowledge to more than 80 ASQ Certified Quality Engineers (CQEs), Certified Six Sigma Green Belts (CSSGBs), Certified Six Sigma Black Belts (CSSBBs), Certified Reliability Engineers (CREs) and Quality Process Analysts (QPAs), with a pass rate of more than 95 percent.

## The First Pupil

Karen, a fellow Michiana Section member, was having trouble passing the Certified Quality Engineer (CQE) exam.

Bill invited Karen to his family's home to prepare for the exam. While sitting at the kitchen table, Bill asked Karen if she knew the definition of an alpha error. Karen grabbed her cheat sheet and read out loud, “An alpha error is the rejection of the null hypothesis when the null hypothesis is true.” When Bill asked her to translate her definition to laymen's terms, she said, “I have no idea how.” In fact, all of Karen's notes resembled a boring textbook—full of definitions and formulas, but not much else.



Bill Hooper (pictured) explains how he uses a deck of cards to teach probability theory in “Ace that Exam” on page 2.

**Bill Hooper explains how he uses a deck of cards to teach probability theory to his certification students**

The probability of pulling four aces from the deck is an example of the multiplication theory of probability. In Bill's class, the deck of cards is cut, handed to a student, who then shuffles the cards and makes four piles on the table. Magically, the four aces are on top of the four piles, even after they are shuffled. The odds of this happening are calculated by the multiplication formula for probability and work out to approximately .5 out of million. They know it can't happen. Their job is then to flow chart it, calculate the odds of it happening each step of the process and back into the solution.

"It's amazing how many students actually figure out how it is done," he said. "It's a great example of probability, flow charting, and team work—not unlike what process improvement and problem solving is all about."

Bill knew what he had to do: He had to take away Karen's cheat sheet and start preparing her for the exam from scratch. He assured her that she would reach a state of clarity after a few hours of study. But first, Bill needed to rewire the way Karen perceived and practiced statistics.

To set the tone of their first lesson, Bill showed Karen the parallels between statistics and the American criminal justice system.

Bill explained, "In our criminal justice system, we presume someone is innocent until proven guilty beyond a reasonable doubt. In the statistics/process improvement world, the presumed innocent is called the null hypothesis. The evidence in statistics or process improvement is data, usually found by experimentation, but not always."

Karen's body language shifted from resentful to curious.

Bill then asked Karen to think of a notorious criminal that was put on trial and found not guilty. He explained that "not guilty" does not mean that he/she really didn't commit the crime—it means that there was not enough evidence to prove guilt beyond reasonable doubt. In the statistics or process improvement world, he explained, it is called beta error.

At that point, Karen's body language went from curious to inquisitive.

Then, Bill asked her to think of someone that was put on trial, really did not commit the crime, but was still found guilty beyond reasonable doubt. He explained that in the statistics and process improvement world, that is called an alpha error.

Karen's body language shifted from inquisitive to "I got it!"

"When thinking about alpha error, what's easier to remember?" Bill asked. "Someone mistakenly put on trial and found guilty for a crime he/she did not commit or 'rejection of the null hypothesis when the null hypothesis is false'?"

Karen went on to pass her CQE exam. The next year, she received her CSSBB certification. Now, Karen travels around the country as her organization's CSSBB representative for high-level improvement projects.

Karen and Bill ran into each other at a section meeting in 2010. She told him that she'll never forget those days at his kitchen table, learning statistical process improvement techniques from the ground up.

For Karen, what began as a bunch of difficult to understand formulas and definitions became a lifelong learning process almost always relating back to Mr. Alpha and Beta.

But Bill also learned something about himself from his experience tutoring Karen—that he was passionate about teaching, and that sometimes you have to start from scratch at the kitchen table.

**About Bill Hooper**

Bill got his start as an hourly worker in a chemical plant. In 1997, he was chosen by his former employer, Inland Steel Company, to work with a consultant, Dr. Jeffrey Luftig, a colleague of Dr. W. Edwards Deming, on process improvement. Bill was skeptical, like everyone else, until he started applying the new methods and found that they worked.

Bill is someone who believes that the system of process improvement applies everywhere, from industry, to the education system, to government.

"A statistical look at the distribution of academic scores at the secondary education level is correlated to the income of the family," he said. "(W. Edwards) Deming would be furious if all we did was change the school standards. That is like adding a specification to a control chart, which usually results in cheating the system—as the Atlanta School District found out during the past three years."

He continued, "For most processes, we need to determine what the inputs are and find out if they are in control and if they are correlated with the outcome. Then, we and society can change the inputs to the process for permanent change."

Bill is a principal engineer and the only Certified Six Sigma Master Black Belt (CSSMBB), which he refers to as the granddaddy of all certifications, at Elkay Manufacturing, based in Oak Brook, IL, with manufacturing plants throughout the U.S. and at strategic worldwide

locations. In his three years with Elkay, he has facilitated and led numerous process improvement projects.

He holds a bachelor's degree in engineering from the University of Michigan and received his master of business administration from the University of Indiana.

Since 2005, Bill has taught multiple Six Sigma Green Belt and Black Belt courses. He has helped 63 managers, engineers, supervisors, and hourly employees receive ASQ certification. He has led two hourly workers through his course that have passed the CSSGB exam; one of which is pursuing the CSSBB certification in 2012.

Bill started his own consulting company in 2011, designed to teach statistics and process improvement.

### **Un-Geeking Quality— Teaching Methods and Inspiration**

Bill's teachings have expanded to include card magic to explain probability theory and process development; juggling to demonstrate the concept of over-control, and other innovative techniques to breakdown statistical concepts. According to Bill, it is amazing how many people remember the probability of drawing four aces from a deck a year later, but will forget a formula the next day.

#### *The Teachings of Dr. Deming and Dr. Luftig*

Bill is inspired by Dr. W. Edwards Deming's approach in using non-traditional teaching methods.

"Think of Deming's red bead demonstration for his classes, given before thousands—it really is a demonstration of the alpha error. Deming's funnel experiment is based on the same concept," Bill said. "How many people actually can remember and apply the textbook definition of the alpha error without looking it up?"

Bill believes Deming was remarkable educator. While he never had the pleasure of meeting Deming, in 1997 he said he was honored to have learned from Dr. Jeffrey Luftig (one of Deming's colleagues), who is now a professor at the University of Colorado.

"Dr. Jeffrey Luftig told an audience that he would not recognize anyone as an expert in any field unless they have been successful at teaching it. The first course I taught didn't go too well, but doing so made me realize what he meant by that comment. Understanding it is one thing, teaching it is another," he said.

When Bill began teaching again in 2005, he said the "awful" went away. Bill said Dr. Luftig helped him see that there is a strong correlation between how good you are as an instructor and how good you are as an implementer. His direction also

sparked Bill's interest in developing his base of nontechnical terminology, which he says is critical to effective teaching.

#### *The Teachings of Dr. Box*

As someone that has worked on more than 70 design of experiment (DOE) projects in his career, Bill also admires the teachings of Dr. George Box, one of the top DOE gurus. Bill has never met Dr. Box, but has read most of his published work.

Bill said Dr. Box's examples in explaining DOE were taken from real applications and were relatable to those without a technical background.

"Our quality of life would be inferior today without Dr. Box and his thousands of students who went on to lead their own DOE projects," he said.

#### **Impacting the Bottom Line**

Bill has told his two grown children that their college education was paid for not by his undergraduate or graduate colleges, but by ASQ. Certification has helped him advance in his career and has been a factor in growing his income.

Bill finds it unfortunate that many students say that their employers do not reward them with an increase in compensation or career advancement for obtaining an ASQ certification.

"If you have the ability to bring over twice your yearly income to company's bottom line, what company would not want to recognize that and support you?" he said. "It seems low-risk to me and, after all, it turned into a goldmine for Karen's company."

He tells all of his students after they complete his course to plan on 40 to 60 hours of independent study before the exam to reinforce what they've learned.

After this rigorous approach, Bill said he notices a change in his students.

"Improved confidence is the No. 1 change, and strengthened knowledge is No. 2," he said. "Most will think nothing of standing up before an audience of executives and giving a high-level data-based report out; many will think nothing of facilitating a process improvement project before a team of engineers and hourly chemical plant operators; some will even think nothing of presenting before hundreds at an ASQ convention."

Bill said he will be doing this very thing in spring 2012 at the annual International ISO 9000 and the Lean and Six Sigma Conference, which is a conference organized by quality professionals (the ISO 9000 Conference is organized in association with ASQ). The topic of his presentation is "What They Don't Teach You At Lean and Six Sigma School." Naturally, he said,

this presentation will begin the same as he does all of his classes; he'll ask the audience "what is an alpha error?"

Bill has spoken at nine ASQ events during the last two years, from ASQ section meetings to the 2010 ASQ World Conference in St. Louis.

## Next Steps

Bill hopes to continue his journey in the spirit of Dr. Joseph M. Juran, who once said that he was a born educator, nothing more.

"That was Dr. Juran's lifelong dream, and it is what probably kept him going to the age of 102," he said. "I see myself as an educator, too."

Bill still teaches pro bono at his kitchen table, but because of his increasingly busy work and speaking schedule, this is generally reserved for family members, the unemployed, or those experiencing financial hardships. Every year, he offers a four-hour workshop on beginning DOE for free.

Bill's quality journey began as a chemical plant worker who had no idea what the purpose of a control chart was or the power of a 5 factor 2 level ½ factorial experiment. But in that role, after learning from Dr. Luftig, he began to see the world through a lens of correlations; for example, his first revelation was that the process to extract industrial sulfur is very similar to how a human kidney works.

Fifteen years and five certifications later, Bill is helping others grow as quality professionals.

His passion for teaching all started at his kitchen table volunteering for his ASQ section and asking Karen, "What is an alpha error?"

Karen still hasn't asked for that cheat sheet back, Bill said.

## About the Authors

**Bill Hooper** is the Master Black Belt at Elkay Manufacturing, a multinational company headquartered in Oak Brook, IL. Elkay manufactures custom sinks, cabinetry, faucets, water coolers, and countertops. He is also president and founder of William Hooper Consulting Inc., a consulting firm dedicated to the teaching of statistically based process improvement. Bill also enjoys raising the voice of quality by participating in public speaking engagements where he uses some of the same concepts to reach his audience.

He resides in Naperville, IL, with his wife, Maude. He has two adult children, one of who is an ASQ Certified Quality Process Analyst (CQPA), and four grandchildren—who are not quite old enough to attend his courses.

**Megan Schmidt** is an ASQ staff writer.

## For More Information:

- Email [william.hooper@elkay.com](mailto:william.hooper@elkay.com)
- Visit his website at [williamhooperconsulting.com](http://williamhooperconsulting.com) to learn more about the power of statistical based process improvement and his unique teaching methods.
- Read more case studies about ASQ certification at [asq.org/knowledge-center/certification-news/index.html](http://asq.org/knowledge-center/certification-news/index.html)
- Details on ASQ certifications are available at [asq.org/certification/index.html](http://asq.org/certification/index.html)

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