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Developing Effective Red X® Problem Solvers

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Red X® problem solving is a skill that needs to be learned and developed. As with any skill, students must pass through four phases of competence before they are fully developed. We all start out Unconsciously Incompetent: we don't know what we don't know. When we become exposed to a new skill, we suddenly become Consciously Incompetent: we realize that there is a potentially useful skill that we can't perform. If we decide to invest the time and effort in learning the skill, we can eventually become Consciously Competent: if we are focused, we will perform the skill properly. With further practice, we eventually become Unconsciously Competent: the skill has become a habit, performing it properly is now second nature. (https://en.wikipedia.org/wiki/Four_stages_of_competence)

Often a skill will not be properly developed without the support of a qualified coach. A qualified coach has moved beyond Unconsciously Competent to become Reflectively Competent: she can break the skill down into component parts, observe where the candidate is failing and communicate effective drills or exercises to reach competence. It is a rare individual who can develop Red X® problem solving skills without the support of a qualified coach.

Red X® problem solving is a highly structured and disciplined system for finding the hidden causes that are keeping systems (either manufacturing processes or products) from performing properly. It is particularly effective at revealing higher order interactions (3, 4 or 5 factors). Its foundation is built on two principles: The Red X principle and Y → X™ Thinking.

The Red X principle was discovered by Dorian in 1947. It recognizes that the contributions to system variation are controlled by a power function, e.g., Juran's Pareto principle, such that no matter how many cause-effect relationships have been discovered and controlled, within the remaining variation, one cause-effect relationship is dominant. This recognition refutes Walter Shewhart's belief that once a process achieved a state of statistical equilibrium, the remaining sources of variation were random and undiscoverable.[1]

The Red X principle deals with a natural phenomenon. It is an understanding of the physical world that leads to a scientific revolution and a new ability to solve problems. Such insights were the topic of Thomas Kuhn's seminal book The Structure of Scientific Revolutions.[2] Here Kuhn introduced the concept of a paradigm shift; supported by numerous examples of scientific breakthroughs that were only possible when a new paradigm replaced conventional understanding. Kuhn noted that a paradigm shift cannot be forced. He compared the event to achieving fluency in a new language. You don't wake up one day and decide that today I will become fluent. After study, practice and often immersion, you suddenly realize that you are forming thoughts in the new language. The key here is that to accept a new paradigm requires an 'aha' moment that can't be forced.

[1] *Economic control of quality of manufactured product. New York: D. Van Nostrand Company*
[2] *The structure of scientific revolutions. Chicago: The University of Chicago Press*

Y → X™ Thinking is a structured approach for revealing the Red X, when it is hidden. Properly applied it converges on the Red X through a progressive search that eliminates those subsystems that can't be involved in driving the variation. Instead of asking 'what's wrong', Y → X™ Thinking asks, 'what's different'.

Unlike Kuhn's paradigms which deal with natural phenomena, Y → X™ Thinking is an approach. It is consistent with the paradigms described by Joel Arthur Barker in his book, Paradigms.[3] Kuhn's paradigms deal with the understanding of the physical world. Accepting a new paradigm requires rejecting the previous understanding. Kuhn describes competing paradigms as incommensurable. Consider the transition from the phlogiston model of chemistry to modern chemistry. Joseph Priestly, who first isolated oxygen, called it dephlogisticated air believing that he had removed the phlogiston. Lavoisier, the father of modern chemistry, argued that oxygen was its own element and that combustion was a chemical reaction. Priestly never accepted Lavoisier's conclusion and eventually died convinced that Lavoisier was a fool. Barker's paradigms are new approaches to achieving results such that the new paradigm doesn't require the previous model to be false. The new approach is simply a better way to do something. Like Kuhn's paradigms, adopting Barker's paradigms still require an 'aha' moment.

The key challenge in developing effective Red X® problem solvers is that candidates must experience two paradigm shifts that cannot be forced. To encourage those shifts, classroom training and coaching are combined, with the understanding that the 'aha' moments will occur while working on projects. Candidates are expected to have projects (problems with hidden causes) assigned, a coach identified and management sponsorship in place before they attend the first class.

Classroom training employs accelerated learning principles. Students are organized into small teams and they work together on case studies that illustrate the application of concepts, structure and tools. Instructors are drawn from a pool of experienced coaches and further developed in presentation skills. Questions are encouraged. They are often related to a specific situation that the student is facing. We expect all instructors to be able to cite personal experiences where they have dealt with similar situations.

While the foundation principles are introduced and explained they are not preached. The emphasis is on the next level of technology, framework. In Red X® problem solving the framework consists of a series of tools that support a Y → X™ investigation. These framework tools help ensure that each problem-solving team has:

- a focused project statement,
- has documented the structure of the system,
- has planned the next investigative step based upon sound strategy,
- has documented the convergence toward the Red X with each completed step,
- has confirmed the identity of the Red X,
- has understood the physical nature of critical cause-effect relationships,
- has developed and implemented a sustainable solution.

[3] *Paradigms: the business of discovering the future. New York: Harper Collins Publishers*

The top level of the problem-solving system consists of tools that have been honed and refined to be statistically simple while remaining statistically sound. These tools support the execution of strategy. Most have graphical outputs that not only support convergence but reveal key details of the cause-effect relationships. Students are introduced to an initial set of basic tools in the Apprentice class. They exercise the tools along with strategy development while working on in-class case studies. Guidelines for the proper application are provided in a pocket guide and an online reference manual. Proprietary Shainin software is also provided to each student to support the proper application of each tool and interpretation of the results.

The Journeyman class builds upon the knowledge and understanding gained from Apprentice and participation on a Red X® project team. Once again, students work in small teams on case studies. These case studies introduce more sophisticated strategies and techniques.

At the completion of each class the students have gained knowledge but they do not yet have understanding. The distinction is brilliantly illustrated by Destin Sandlin in his "Smarter Every Day" YouTube video, "The Backwards Brain Bicycle" https://www.youtube.com/watch?v=MFzDaBzBlL0 From the perspective of the Four Stages of Competence, students are consciously incompetent. They have been exposed to many strategies and techniques but are not able to apply them without coaching support.

Each student is assigned a coach and a cadence of coaching sessions is established immediately following the class. The coach is not expected to solve the problem, but to guide the students' development so that they can solve the problem and become consciously competent to develop and execute strategy.

Coaches (Red X® Masters and Shainin Consultants) are strong problem solvers who have been developed to coach others. Candidates must have a track record of solving challenging problems in a wide range of technologies. They must have the interpersonal skills to coach others. Red X® master training focuses on recognizing where a team has failed to properly develop strategy or apply tools. The master class teaches candidates to recognize breakdowns and how to help a team get back on track. Prior to attending the class, master candidates are evaluated for their technical competence and should be endorsed by their management as possessing the interpersonal skills necessary to coach. Following the class, master candidates are observed by a Shainin consultant as they coach teams and are then given one-on-one feedback. To become a Red X® master a candidate must successfully develop two Red X® Apprentices and two Red X® Journeymen. Those certifications are provided by Shainin as a third party independent assessment of demonstrated skills.

It has been seven decades since Dorian discovered the Red X principle and started developing tools to support a disciplined, structured approach to solving unsolvable problems. We have continued to innovate to solve problems faster and develop effective problem solvers for our clients. We are committed to questioning conventional thinking and developing better ways to solve problems and support our clients' efforts to improve quality, reliability and productivity.

Training Services at Shainin (4/4/2018)