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Root Cause Basics

Root cause analysis is an effective tool used both reactively, to investigate an adverse event that already has occurred, and proactively, to analyze and improve processes and systems before they break down.

Root Cause in Health Care: Tools & Techniques,
The Joint Commission on Accreditation of Healthcare Organizations

Why Root Cause Analysis?

- *Root Cause Analysis* (RCA) helps dissolve the problem, not just the symptom.

  Often, schools approach the symptom, e.g., poor attendance, as if it were the problem rather than a result. By focusing on the symptom, strategies are often misdirected and the causes for the problem remain untreated—enabling the symptoms to remain or reemerge.

- Root cause analysis eliminates patching and wasted effort.

  Symptoms are often "dealt with" by coming up with a patch to cover them or to deal with their consequences. Many so-called compensatory programs are simply patches on a system where the original effort to teach/learn has been unsuccessful. Patches add complexity to the system, require additional resources, and create additional work. All of this amounts to wasted effort.

- Root cause analysis conserves scarce resources.

  By eliminating fundamental (root) causes, symptoms can be reduced or eliminated, thereby conserving the need for additional resources. Remedies that do not consider root cause often fail to eliminate the symptoms. Resources are usually thought of in terms of time, money, space and personnel. However, such resources as good faith effort, commitment, voluntary participation, and resolve must also be conserved.

- Root cause analysis induces discussion and reflection.

  Too often, we do not discuss and reflect on our practices. Root cause analysis provides the means whereby discussion and reflection can take place in a nonthreatening and open context. The introspection, quality, and depth of root cause discussions exceed typical problem solving where conversations jump from symptom to solution. Opinions not founded on data are rejected until proven. Knee-jerk reactions to problems are greatly reduced, if not eliminated.

- Root cause analysis provides rationale for strategy selection.

  We cannot fix something until we know what is wrong. By focusing on dissolving the most fundamental causes for problems, we can then select strategies that are properly targeted on the cause rather than on the symptom. By identifying the cause, one can justify strategies that are aimed at the cause rather than the symptom.

What is "Root Cause"?

Rather than assume knowledge of what a "root cause" is, let's first look at several definitions:

From the Savannah River Project (a nuclear power station):

> *Root Cause is "the most basic cause that can reasonably be identified, that we have control to fix, and for which effective recommendations for prevention can be implemented."*

From Medical Risk Management Associates:

> *Root Causes are "the underlying causes of adverse outcomes."*

From the Joint Commission on Accreditation of Healthcare Organizations:

> *Root Causes are "the basic or casual factors that underlie variation in performance, including the occurrence or possible occurrence of a sentinel (major) event."*

From Business Solutions—The Positive Way:

> *Root Causes are the "basic cause or causes" of the problem or symptoms.*

From "Total Quality Schools," by Joseph C. Fields:

> *A Root Cause is "the most basic reason the problem occurs."*

Other organizations differentiate between "contributory" or "proximate" causes and root causes. Often, the most immediate or obvious cause is mistak-

enly identified as the root cause when, instead, it is simply the most proximate contributory cause, which itself has much deeper roots.

> **Example**: Often, blame is first centered on an individual. Although an individual may have indeed committed an error that resulted in a problem, a deeper cause may be found in areas such as: training of the individual, scheduling of the individual, assignment of duties, clarification of duties, supervision, work environment, or any one of a host of other issues. Most people involved in root cause analysis understand that the vast majority of root causes are system-based rather than individual-based.

For purposes of this guide, the following definition suffices:

> ***Root Cause**—the deepest underlying cause, or causes, of positive or negative symptoms within any process that, if dissolved, would result in elimination, or substantial reduction, of the symptom.*

Let's look at this definition again, this time highlighting and commenting on its various essential components:

> **Root Cause**—the *deepest* underlying *cause, or causes*, of *positive or negative symptoms* within any *process* that if *dissolved* would result in elimination, or substantial reduction, of the symptom.

- **Deepest**—this means that we really have to dig deep to find most roots. They usually are not the most immediate, obvious, or proximate causes. Often, they are three, four, or five layers down into the system.

  Example: A high school has a high number of local (general) diploma graduates. However, the state is requiring that 100 percent of graduates have academic diplomas within a few years. Taking a detailed look at the local diploma recipients, it is found that fully two-thirds either had exceeded academic diploma requirements or were close to them. Upon further investigation, it is found that guidance counselors, and even the high school principal, communicate to parents and students that the academic diploma is not necessary for college acceptance or future success. Emphasis is placed on SAT scores instead. In discussions with the counselors and principal, it is found that the system has never placed emphasis on academic diplomas, and, in fact, the school's personnel felt they were doing their duty in accordance with what they believed the school system and the community wanted. The district (system) had not communicated this change in goals to its staff.

A few people take issue with the use of the term "root cause" and prefer instead the concept of "causal analysis." Their reasoning is that the concept of "root cause" came out of an industrial mechanical environment that is not suited to education and that there are usually multiple causes rather than a single root. Obviously, I have chosen to stick with the concept of "root cause." I really do not care where it was first used because I believe the metaphor works in any context. I especially like the concept of "root" because it implies that we must dig deeply to find cause. To me, the term "causal analysis" facilitates the easy, knee-jerk response of "I know the cause—here it is," rather than demanding the *deep* search that is typically required.

- **Cause or causes**—School systems are social systems. They are far more complex than either mechanical or biological systems. For this reason, it is often impossible to isolate a single root cause, and often it is possible to identify several causes that in combination bring about a symptom. The good news is that often, by dissolving any one of the multiple root causes, the symptoms can be reduced or even eliminated.

  Models and examples: I often think of the fire triangle. It takes three elements to make a fire: a source of combustion, oxygen, and a source of fuel. Take any one of the three away and a fire cannot start or continue to burn. Often, an air crash is the result of the convergence of separate events that in and of themselves would not have caused an accident but when placed in combination result in a disaster. It has been found, in some instances, that a student can "survive" any one deficient process within a school but that when faced with two, three, or more, the student quickly falls behind.

- **Positive or negative**—Our successes, as well as our failures, have root causes. By studying the roots for our successes, we may find strategies that can be applied to improving all of our processes.

  Example: A school district successfully implements the IBM program "Writing to Read." In looking back at its experience, the district identifies the following strategies as contributory to the program's success: direct faculty involvement and agreement in adopting the program; "by the book" training, staffing, and assignment of resources in support of the program; benchmarking and adaptation of a model from another successful school; thorough parent information; and continuous administrative involvement and encouragement. Can these strategies be applied to future programs? You bet!

- **Symptoms**—In dealing with problems, symptoms are found at the surface. They are the "red flag" that draws attention to the issue. A symptom is usually a noticeable gap between expectations and reality.

  Example: A school district has a very high failure rate in ninth grade. Expectations are that most students will successfully transition from middle school to high school. The reality is that over 50 percent of all freshman fail at least one course during the year. The failure rate is the "red flag" as well as a symptom of deeper underlying causes. In order to eliminate the symptom, the deeper underlying root causes have to be dissolved.

- **Process**—All work is process. A simple process has a minimum of three elements: a) input, b) added value, and c) output.

  Example: Writing (and mailing) a letter is a process. It has certain elements of input, such as blank paper, a blank envelope, a pen, a stamp, a source for the address as well as concepts to be placed in the letter as content. Then there is the value added process of actually composing and writing the letter followed by the physical mailing of the previously isolated elements as a single product. The output is both the physically completed letter and the communication it contains. Once we can identify the input, value added, and the output, we can identify the process. Schools are composed of hundreds of processes—two of the large umbrella processes are teaching and learning.

- **Dissolve**—We have to concentrate on dissolving the root rather than "fixing" the symptom with a patch. Once the root is dissolved, the symptom will go away of its own accord. Patches just add complexity and cost to the system. Some people think that much of what we do in school is patching.

  Example: A school district was faced with a very high number of out-of-school suspensions. Its solution to the problem was to implement an in-school suspension program. This resulted in space, staff and energy being assigned to what essentially was a patch on the system. They never looked at causes for the suspensions in order to substantially reduce or eliminate them.

Perhaps this is more than you ever wanted to know about the definition of "root cause." Hopefully, however, it provides an adequate foundation upon which to move forward and will make some of what follows easier to understand. One more time:

Root Cause—*the deepest underlying cause, or causes, of positive or negative symptoms within any process that, if dissolved, would result in elimination, or substantial reduction, of the symptom.*

Modalities of Root Cause Analysis

The schematic in Figure 1.1 graphically portrays the four modalities of root cause analysis. Root cause analysis is very often conducted in the "negative reactive" modality. That is, it is seeking causes for existing problems. Rarely, if ever, do we think in terms of the "positive reactive" modality, i.e., what made this program a success? What really made it work? By using the "positive reactive" modality we can perhaps find roots that enabled success in one area that can be used to dissolve problems in another.

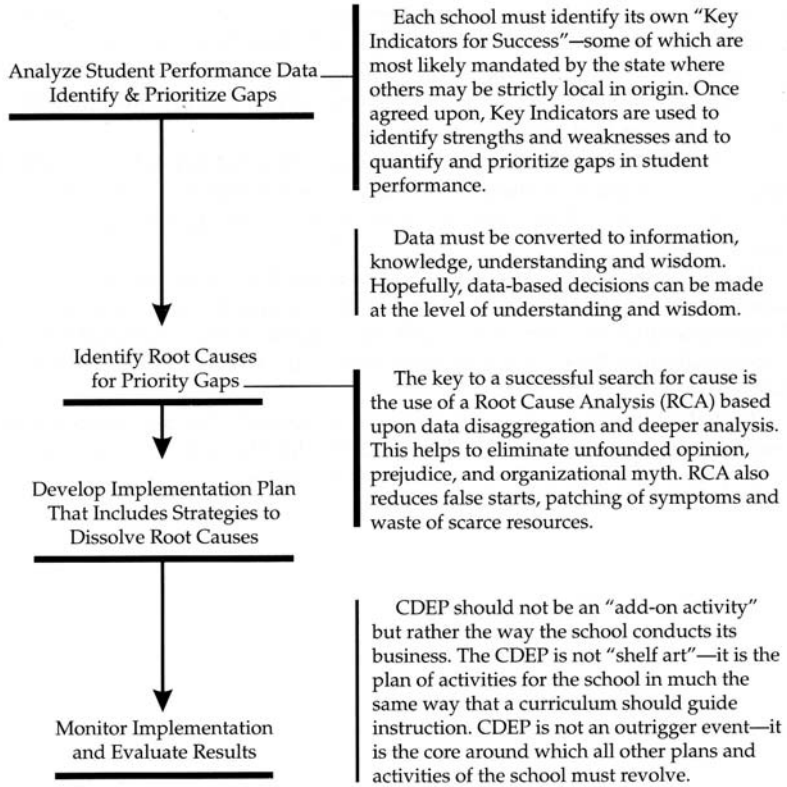
Figure 1.1. Modalities of Root Cause Analysis

	Reactive	*Proactive*
Negative	**Negative Reactive RCA** Seeks to identify and dissolve roots for existing problems Why did this happen? What is holding us back?	**Negative Proactive RCA** Seeks to identify and dissolve potential roots for future problems What fundamental root porcesses, beliefs, attitudes, skills, and knowledge, must we change to bring what we want to fruition?
Positive	**Positive Reactive RCA** Seeks to identify and replicate roots for existing success when appropriate Why was this program a success? What elements contributed to its success?	**Positive Proactive RCA** Seeks to identify and implant roots necessary for future success What fundamental root processes, beliefs, attitudes, skills, and knowledge, must we install to bring what we want to fruition?

To complete this paradigm we must consider both the "positive proactive" and "negative proactive" modalities.

The "positive proactive" modality, as seen in Figure 1.1, asks the question: "What roots will be necessary to achieve success in this new initiative?" It then seeks to plant these roots prior to the implementation of the initiative. This is sometimes difficult and might appear as putting the cart before the horse. In

Figure 2.6. New York's Comprehensive District Educational Planning: Importance of Key Indicators and Root Cause Analysis



Flowchart graphically illustrates Comprehensive District Educational Planning (CDEP) as a four-step process. Its original format was six steps.

Comments developed by Dr. Preuss for use with, and in support of, New York's Comprehensive District Educational Planning process.