



NeMTSS
FRAMEWORK



December 2019

NeMTSS Research Brief

Root Cause Analysis Research Summary

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CHILDREN, YOUTH, FAMILIES & SCHOOLS**

Root Cause Analysis Research Summary: An NeMTSS Research Brief

Key Points:

- Root cause analysis helps schools use data to solve problems by identifying the correct root causes of problems or events, rather than addressing their symptoms (Preuss, 2003).
- In the past root cause analysis has been used to target the root cause of lagging graduation rates, student achievement, and overall disfunction in schools (Bryk, 2013, 2015, 2018).
- Procedures for conducting a root cause analysis are detailed on pages 2-5.
- The problem-solving process associated with RCA can help administrators, teachers, and other stakeholders identify areas where resources would be best allocated. Improving entire school systems can take a considerable amount of time and resources, and an RCA may be an essential first step to that process.

Overview

Root Cause Analysis (RCA) has been used in the past in a variety of fields like medicine, industry, science, and education (Silverstein, 2014). According to the U.S. Department of Health and Human Services Agency for Healthcare, Research, and Quality:

A central tenet of RCA is to identify underlying problems that increase the likelihood of errors while avoiding the trap of focusing on mistakes by individuals. The goal of RCA is thus to identify both active errors (errors occurring at the point of interface between humans and a complex system) and latent errors (the hidden problems within contribute to adverse events) (Wu et al., 2019)

Root cause analysis helps schools use data to solve problems by identifying the correct root causes of problems or events, rather than addressing their symptoms (Preuss, 2003).

Root Cause Analysis in Education

Root Cause Analysis has been employed in various education systems to address causes problems and identify areas of improvement and remediation. For example, root cause analysis has been used to target the root cause of lagging graduation rates, student achievement, and overall disfunction in schools (Bryk, 2013, 2015, 2018).

Preuss (2003) proposes that there are several “levels” of root cause:

1. Incidental or procedural Level

- *Example: A fight in the cafeteria, fifth period on Wednesday*
- This level includes the student, a test, a teacher, or an incident.

2. Programmatic Level

- *Example: There are always fights in the cafeteria, every day, at every period*
- This level includes instructional processes, training, and staff development. Administrative procedures, curriculum assessment, materials, setting, and time.

3. Systemic Level

- *Example: There are fights everywhere in school*
- This level includes leadership, policies, values/beliefs, planning, budget, facilities, organizational structure, technology, collaboration, culture, and priorities.

4. External Level

- *Example: The whole community is fighting*
- This level includes family, community, wealth/poverty, health, partnerships and supporting agencies, the media, youth culture, and gangs.

Conducting a Root Cause Analysis

According to Preuss (2003), there are several modalities of root cause analysis. Thinking about RCAs using these modalities can help guide the problem-solving process and help identify strengths and weaknesses in schools, programs, or systems.

Table 1. Modalities of Root Cause Analysis

	Reactive	Proactive
Negative	<p>Negative Reactive RCA</p> <p>Seeks to identify and dissolve roots for existing problems.</p> <ul style="list-style-type: none"> • Why did this happen? What is holding us back? 	<p>Negative Proactive RCA</p> <p>Seeks to identify and dissolve potential roots for future problems.</p> <ul style="list-style-type: none"> • What fundamental root processes, beliefs, attitudes, skills, and knowledge, must we change to bring what we want to fruition?
Positive	<p>Positive Reactive RCA</p> <p>Seeks to identify and replicate roots for existing success when appropriate.</p> <ul style="list-style-type: none"> • Why was this program a success? • What elements contributed to its success? 	<p>Positive Proactive RCA</p> <p>Seeks to identify and implant roots necessary for future success.</p> <ul style="list-style-type: none"> • What fundamental root processes, beliefs, attitudes, skills, and knowledge, must we install to bring what we want to fruition?

Preuss (2003)

Preuss (2003) argues that in complex social systems like schools, it may be difficult to identify one single root cause. In that instance, there may be clusters of causal factors that each contribute to the problem. He provides some adapted questions by Ammerman (1998) to help guide the identification process.

1. Would the problem have occurred if the cause had not been present?
 - If no, then it is a root cause.

- If yes, then it is a contributing cause
- 2. Will the problem reoccur as the result of the same cause if the cause is corrected or dissolved?
 - If no, then it is a root cause.
 - If yes, then it is a contributing cause.
- 3. Will correction or dissolution of the cause lead to similar events?
 - If no, then it is a root cause.
 - If yes, then it is a contributing cause.
- 4. Other indicators that you have found the root cause are:
 - You run into a dead end asking what caused the proposed root cause.
 - Everyone agrees that this is a root cause.
 - The cause is logical, makes sense, and provides clarity to the problem.
 - The cause is something that you can influence and control.
 - If the cause is dissolved, there is realistic hope that the problem can be reduced or prevented in the future.

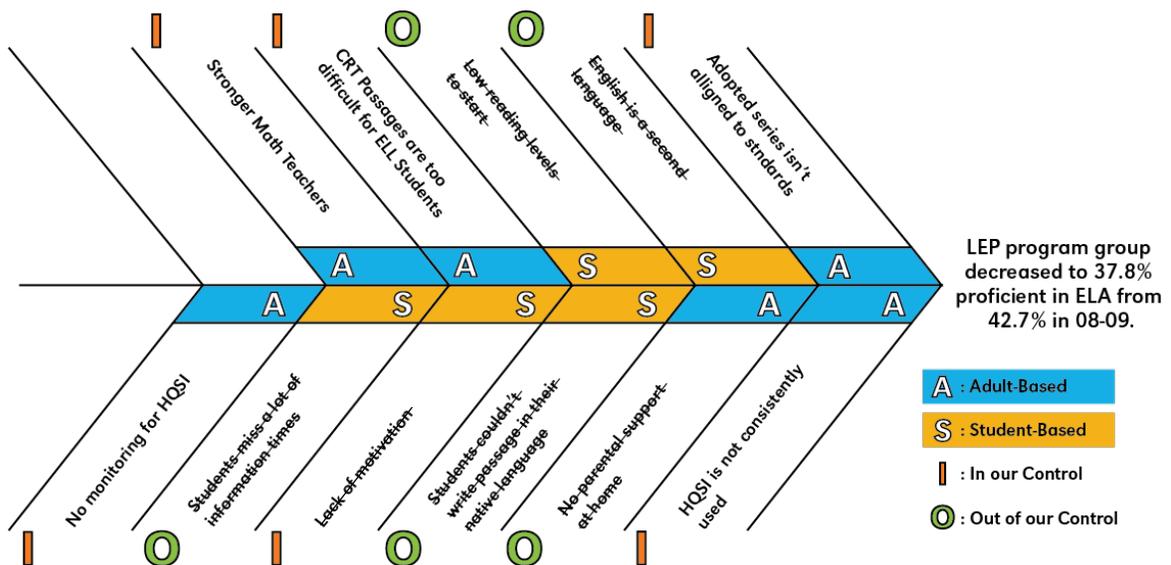
The data can then reveal one or more problems that may be addressed in an RCA. Preuss (2003) outlines steps and criteria for narrowing down explanations of the performance data in question.

- **Step 1:** Eliminate explanations that are not within our control.
 - First, your team needs to eliminate explanations that do not lie within the control of your school/district and put these explanations aside. The following questions could help with this process.
 - Over what do we believe we have control (e.g., students completing homework, parents supporting their students, etc.)?
 - What factors are beyond our influence?
 - Would others agree? Are we thinking too broadly, too narrowly, or accurately?
- **Step 2:** Evaluate the quality of your explanations (reach consensus on which ones to keep)
 - The following criteria can be applied by your team to evaluate the current list of explanations and to whittle your list down to the —best thinking available across the team. Use the questions below each criterion to help check the thinking of your team. Eliminate explanations that fail to meet these criteria.
 - **Criterion:** The explanation derives logically from the data
 - Can we articulate the connection(s) we see between the data and our explanation(s)?
 - Does our explanation reflect a genuine situation, but one that is not related to this data?
 - Can we tell the story of how our explanation could lead to the patterns we see in our data?
 - **Criterion:** The explanation is specific enough to be testable
 - Is the language specific enough to be clear to someone who was not part of our discussion?
 - Are there any vague terms?
 - Can we describe how we would we test the explanation?

- **Criterion:** The explanation is plausible
 - Does any research support this thinking?
 - If we base any planning steps on this explanation, do we anticipate meaningful results?
- **Step 3:** Clarify the language used in your explanations.
 - Consider the following questions to clarify remaining explanations.
 - Do our explanations make sense to someone else reading or hearing them for the first time?
 - Is our explanation complex enough to help us to better understand a complex situation?
 - What other questions do our explanations lead us to in order to make the picture more complete?
 - Does this explanation identify an area of concern?

One popular graphic organizer to help educators or other individuals conceptualize the root cause(s) of a problem is the “Fishbone Diagram”. Instructions and example below. *Taken from Clark County School District (2012).*

- Label each one either “S” if it is a student generated cause or “A” if it is an adult generated cause. Cross out all the “S” causes.
- Label each remaining adult cause “I” for In Our Control or “O” for Out of Our Control. Cross out all the “O” factors.
- Be sure that the remaining causes are supported by at least three data sources. The data may tell a different story than what the team perceived, and it may create another cause to add to the fishbone.
- Use the 5 Why Method (asking “why” enough times until you get through all the symptoms of a problem and down to the root cause). If a question cannot be answered completely, then that factor is NOT the root cause, and should be removed.



The problem-solving process associated with RCA can help administrators, teachers, and other stakeholders identify areas where resources would be best allocated. Improving entire school systems can take a considerable amount of time and resources, and an RCA may be an essential first step to that process. However, Bryk (2010, 2015) insists that there are five essential supports that are crucial to advancing student achievement in any school improvement effort. According to his research, (1) a coherent instructional guidance system, (2) professional capacity of staff, (3) strong parent-community-school ties, a (4) student-centered learning climate, and (5) a leadership team that drives change are all key pieces of support in any effort to improve a school system.

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Recommended Citation:

Rangel-Pacheco, A. & Witte, A. L. (2019). *Root Cause Analysis: An NeMTSS Research Brief*. Nebraska Multi-tiered System of Support (NeMTSS).

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