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Root Cause Analysis: Parsing Complex Challenges in Academic Libraries

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ABSTRACT

Root cause analysis (RCA) has been used in government, technology, health care, and other sectors for over 60 years. It assists organizations in identifying the original, most authentic cause or causes of an extremely complex problem. Depending on the nature of the problem, the organization can then make plans to mitigate the problem or avoid similar situations in the future. Scholarly library literature does not provide examples of any libraries using RCA. This article aims to present RCA as a strong and relevant addition to academic libraries' array of problem-solving tools. It outlines three models of RCA so that libraries may choose one that suits their needs. As academic libraries almost invariably exist in complex universes of stakeholders, funding, politics, and other factors, I believe that RCA is a natural fit for approaching their challenges efficiently.

Introduction

Root cause analysis (RCA) has helped numerous government agencies, high-tech businesses, health care organizations, and, to a lesser extent, educational organizations trace the origins of highly complex problems for over 60 years. RCA's goal is to trace a problem back to its initial causes so that organizations in charge of the process can prevent the event from happening again or mitigate a current situation. Organizations typically use RCA to investigate multifaceted problems that occur in environments that involve multiple stakeholders, a variety of needs, countless possible failure points, pressure to succeed for the greater good, and, frequently, complicated financial situations. I wrote that description while reading about prevention of nuclear accidents (Nelson & Van Scyoc, 2009); however, all of those descriptors characterize academic libraries just as closely.

How can academic libraries benefit from adopting processes of RCA? Simply put, administrators and others making major decisions at academic libraries constantly face problems, financial and otherwise, that stem from incredibly complicated intertwined factors. It is all too easy to begin to see problems as insurmountable, or to automatically focus on the most common challenges (flat budgets, wavering enrollment statistics, non-optimal staffing levels, and so on), rather than taking a detailed, critical look at other potential causes. In addition, most library administrators have progressed through a particular subspecialty of librarianship, for example, moving up the ranks from serving as a science librarian to administering a natural sciences branch library to administering an institution's library system (likely with several additional steps in between). Thus, it is natural that an individual library administrator, no matter how experienced and broadly trained, will have stronger and weaker areas in terms of expertise. The processes of RCA help administrators from all backgrounds parse problems back to their sources, without necessarily having to have deep knowledge of a given area. Tasks related to deeper analysis, mitigation, or creating solutions can then be distributed to colleagues with applicable expertise.

I strongly believe that RCA's capacity to help librarians and administrators to examine large-scale problems of unknown cause, as well as highly complex problems for which tentative causes have been identified, makes it an important addition to the suite of problem-solving tools available to academic libraries. High-tech, business, government, and other sectors have spent over 50 years developing and perfecting models of RCA with different focuses such as examining finances, tracing complicated customer service issues, or integrating large amounts of data into the investigation process. The types of problems that these RCA models trace all align with various challenges that academic libraries face. I believe that academic libraries can and should take advantage of these tools, particularly in order to probe the large, systemic problems that often go uninvestigated or unsolved—even in libraries that tend to solve smaller problems efficiently.

This article aims to present several major models of RCA. It also intends to help librarians and administrators match their own complex workplace challenges with models that can help to parse and better understand these problems. The article does not provide sufficient detail to perform complete RCA on a problem. Rather, it will help readers to select a method and guide them to a source or sources that do detail that method in full.

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Problems that merit RCA

RCA can be used to attempt to trace the original cause(s) of any problem. It is generally used in situations in which a program's administrators believe that finding original causes would either help prevent a negative situation from happening again, or that finding original causes would help to improve the current situation.

After reading numerous sources on RCA, I identified a number of other characteristics of problems for which administrators frequently use RCA. Note that none of these conditions are mandatory for its application.

- Complicated causation: In all cases using RCA, the question of *why* an event or problem has occurred is difficult to determine using surface-level observation or any one individual's expertise.
- Multiple factions involved: Numerous organizations, departments, or individuals with disparate roles and responsibilities are involved with a problem or event. Administrators aim to trace and map factors in the problem or event to specific factions.
- Expertise: RCA-worthy problems typically require expertise from a variety of individuals or organizations to solve them. Administrators may or may not know who the constituents may be when they begin analysis. However, they sense from the outset that the problem is beyond any one individual or group's reach.
- Financial concerns: Problems approached using RCA often involve amounts of money that are significant to the organization.
- Competing interests: In some professions that often employ RCA, competing interests between two or more groups, often with different levels of sociopolitical or personal power, are routinely a factor. They are frequently locked in a cyclical struggle that leads to an ongoing situation or exacerbates an acute problem (Thwink.org, 2014).

Selecting a model of RCA

When planning to use RCA to analyze a specific situation, it is important to find a model that aligns with the situation to be studied. When a librarian or administrator uses RCA for the first time, it is easy to feel intimidated by two things: (a) the sheer number of models of RCA that are readily available, and (b) the amount of theory and background information covered by books and journals on RCA. One further complicating factor is the fact that some organizations tout the value of proprietary forms of RCA. Proprietary forms may require administration by a trained expert, often for a significant fee. They may not make usable information available for free. Of course, investing in an expert with an outside viewpoint may be worth the time and money. This article, however, will focus on three sources of RCA that librarians and administrators can access for free (online or through library resources), experiment with, and act upon with in-house colleagues.

United States Department of Energy Root Cause Analysis Guidance Document

An unassuming 69-page book available freely online, the United States Department of Energy's (1992) *Root Cause Analysis Guidance Document* is one of the sources that other works on RCA refer back to again and again. The Department of Energy has used RCA heavily for decades and has created clear instructions to help its employees use RCA procedures. The strength of this model is that it approaches the problem quickly and focuses on assessing the problem and creating solutions, without a great amount of extraneous analysis or necessary generation of models and graphics.

Situations covered by the *Root Cause Analysis Guidance Document* typically relate to a single "occurrence" (U.S. Department of Energy, 1992, pp. 1–2). However, users very easily modify practices to approach ongoing problems, as readers will see in this paper's "Scenario" section. All problems approached with this model will work through the same five basic stages: (a) data collection, (b) assessment, (c) corrective actions, (d) inform, and (e) follow-up (U.S. Department of Energy, 1992, pp. 1–2). Prospective users choose from among six potential analysis methods by comparing several aspects of their situation plus desired outcomes with criteria provided in the document (U.S. Department of Energy, 1992, pp. 11, 13–14). Forms of analysis covered in the document include: (a) events and causal factor analysis, (b) change analysis, (c) barrier analysis, (d) Management Oversight and Risk Tree (MORT), (e) human performance evaluation, and (f) Kepner-Tregoe problem-solving and decision making. The Kepner-Tregoe model is "used when a comprehensive analysis is needed for all phases of the occurrence investigation process" (United States Department of Energy, 1992, p. 14).

PROACT RCA work process

One of the leading figures in the field of RCA is Charles J. Latino, the "Father of Manufacturing Reliability" (Latino, Latino, & Latino, 2011, p. xv). Latino, founder of the Reliability Engineering Department at Allied Chemical Corporation (which is now Honeywell), developed his form of RCA, later branded as PROACT, through decades of meticulous monitoring of mechanical systems and human teams that manufactured nylon (Latino et al., 2011, pp. xv–xvi). His children Robert, Kenneth, and Mark Latino have continued his work and now run Reliability Center, Inc., a company which provides consulting, training, and software on RCA.

Experts on PROACT explain that PROACT is most useful for "large, asset-intensive" organizations (Latino et al., 2011, p. 1). PROACT is typically used for problems that arise among an entire team of people who perform a process together; it is not intended to work on problems that can be easily tracked to a single team member (Latino et al., 2011, p. 20). It utilizes the concept of "key performance indicators" (KPI)—basically, identifying what types of data indicate a current problem and would change if the status of the problem were improving (Latino et al., 2011, p. 4). Through the PROACT model, users identify KPI to follow, create an improvement process, and then track the KPI over time (Latino et al., 2011, pp. 8–9). Through an example and discussion, the Latino brothers explain that users may not know which indicators are the most important in a realistic, highly complex problem within an organization (Latino et al., 2011, p. 1). PROACT will help them to sort this out for purposes of prioritization and targeting.

The PROACT model offers multiple benefits. It is highly flexible in terms of structure and procedures. It is decidedly data-driven. It guides users to identify, collect, and analyze data relevant to problems in their organizations; to map out and potentially alter workflow processes used in their organizations (Latino et al., 2011, p. 11); and to acknowledge, examine, and learn from problems identified during RCA. Latino, Latino, and Latino put significant emphasis on reasons why individuals and organizations fail to acknowledge and glean lessons from their failures (Latino et al., 2011, pp. 24–25). PROACT trains users to do just this. Organizations that use the PROACT model will end up with useful byproducts of flowcharts, tables of data, and additional data visualizations that can be used to communicate changes to employees and, in a higher education setting, to university administrators. Software—as well as consultants—are available for organizations that wish to invest in PROACT in terms of materials (Latino et al., 2011, p. 20; Reliability Center, Inc., 2017).

One popular option within PROACT is using a "balanced scorecard" model. A balanced scorecard helps users follow perspectives, objectives, and measures (Latino et al., 2011, p. 7). Since some educational organizations already employ balanced scorecards, this may help these processes to fit in smoothly with some organizations' existing methods.

The main downside to PROACT is that its flexibility and thoroughness make it considerably more complicated than, for example, the Department of Energy model. It is easy to become "bogged down" in