

Final Course Paper

Moshe D. Canty cantym@nyack.edu

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According to Peter M. Senge, “System dynamics is the study of complex systems, including such human systems as families, organisations, cities, and nations.” What is Senge implying? In layperson terms, he is simply stating the obvious, namely that when studying systems, we must understand that they are comprised, primarily, of complex parts that make up the whole. He uses “families, organizations, cities, and nations” to describe the study of these complex systems because when we truly ponder their existence, we come to appreciate just how complex they are. For instance, the systematic makeup of humans is a complex process. Who would doubt that the organization of our organs in the human body is anything but? Similarly, it takes complex humans to construct complex organizations, cities, and nations. However, while all the above may be true, it is also important to note that without complex humans to perform these complex tasks, there can be no existence of any of these complex systems. “Systemic thinking acknowledges that the world is complex” (Systemic Thinking and Education Leadership: Some Considerations, 2004).

This is one of the fundamental principles of systems thinking. Being able to look at the bigger picture and see these interconnected entities operating in cohesive fashion. Every subsystem within the much larger system serving its purpose; no part invalidated from the whole. When we look at systems in this manner, it becomes easier for us to identify how they function. We come to see that no system operates independently. In fact, they all are interdependent on one another, needing each other to function and thrive. Raul Espejo describes a system as, “a mental construct of a whole, for which it is possible to establish a set of interrelated parts that make up the perceived whole” (What is systemic thinking? 1994). Similarly, Peter Morgan of the European Centre for Development Policy Management states that, “systems thinking is about

interdependence and interrelationships.” (The Idea And Practice Of Systems Thinking And their Relevance For Capacity Development 2005). Both Espejo and Morgan speak to the constant interaction between parts.

In addition, this applies to those systems who give us the impression that they do not function in this manner. Imagine for a second the human body functioning without a brain, or the liver. It is impossible you say. However, what about the human body functioning without a finger, toe, eye, or in some cases, a kidney. Will the body still be able to function? The strange irony of systems is that they are inherently imperfect. Where they function well in one area, they may fail miserably in another. Based on this basic rule of thumb, it can be argued that systems are designed to fail. Can you think of any system where this applies? I can, think of the Stock Market. This financial system is as volatile, unpredictable, and outright imperfect as any we could imagine. Yet, despite this, most of us continue to pour our earnings into it. Why? Because just as the system is known to fail us, it is equally known to exceed many of our wildest imaginations. So, are you wondering, “what does this have to do with the human body?” Well, both are sophisticated systems. Just as the human body cannot function without a brain, the Stock Market cannot function without the financial means to trade. Therefore, some systems require more to function than others.

Opponents may take a different approach to the abovementioned, arguing that systems do not always produce the desired outcome that we would prefer. Sometimes that process occurs unintentionally. For instance, does the human body need its finger, toe, eye, or kidney to function? In other words, you can take a significant part away from a system and it will continue to function. After President Kennedy was assassinated, Vice-President Lyndon Johnson took the Presidential oath of office and became the late President’s successor. However, did the system of

democracy crumble with the late president's death? What about the initial firing of Steve Jobs from Apple? What fate did Apple suffer as a result?

Is certainty always a desired outcome of systems thinking? Regarding this latter point, Raji Gogulapati contends, "Although system thinking has the potential to address some of the conceptual problems of today's complex systems, there is no certainty in achieving desired outcomes" (Systemic Thinking, *Journal of Leadership and Organizational Effectiveness*, 2014). Despite these factors, however, "there is no single, generic 'systems' point of view for either researchers or practitioners" (Managerial Applications of Corporate Social Responsibility and Systems Thinking for Achieving Sustainability Outcomes, 2008).

As we see, the characteristics of a system are diverse. In fact, systems can be unsteady, unpredictable, and at times, uncontrollable. The goal—over the course of time—is to help these same systems become steady, predictable, and controllable as was the case with former leader of the U.S.S.R. Mikhail Gorbachev's reforms known as perestroika (restructuring). Economists have claimed that without these policy changes, the former U.S.S.R.'s financial woes would have caused the system to crumble. However, woeful these policies, they were a series of interactions that brought the country to this critical juncture. Was perestroika the result of systemic thinking? Systemic thinking is about understanding these interactions and interconnections and identifying the leverage points to solve the problems in the organization (Examining the Use of Systemic Approach for Adoption of Systems Thinking in Organizations 2017). Gorbachev did not see perestroika as an economic policy focused solely on the smaller problems within the system to the detriment of the much larger issues. Thus, systemic thinking is designed to compel us to look at all these parts interrelatedly.

Research reveals that the benefits to utilizing a systemic thinking approach within organizations are significant. In *Overview of Systems Thinking*, Daniel Aronson, highlights four areas where systems thinking has proven to be invaluable (*Examples are provided by me*):

- a. Complex problems that involve helping many actors see the “big picture” and not just their part of it.

Example:

NASA and its space program

- b. Recurring problems or those that have been made worse by past attempts to fix them

Example:

The levee system in New Orleans, Louisiana before Hurricane Katrina

- c. Issues where an action affects (or is affected by) the environment surrounding the issue, either the natural environment or the competitive environment.

Example:

BP Oil Spill in the Gulf of Mexico

- d. Problems whose solutions are not obvious.

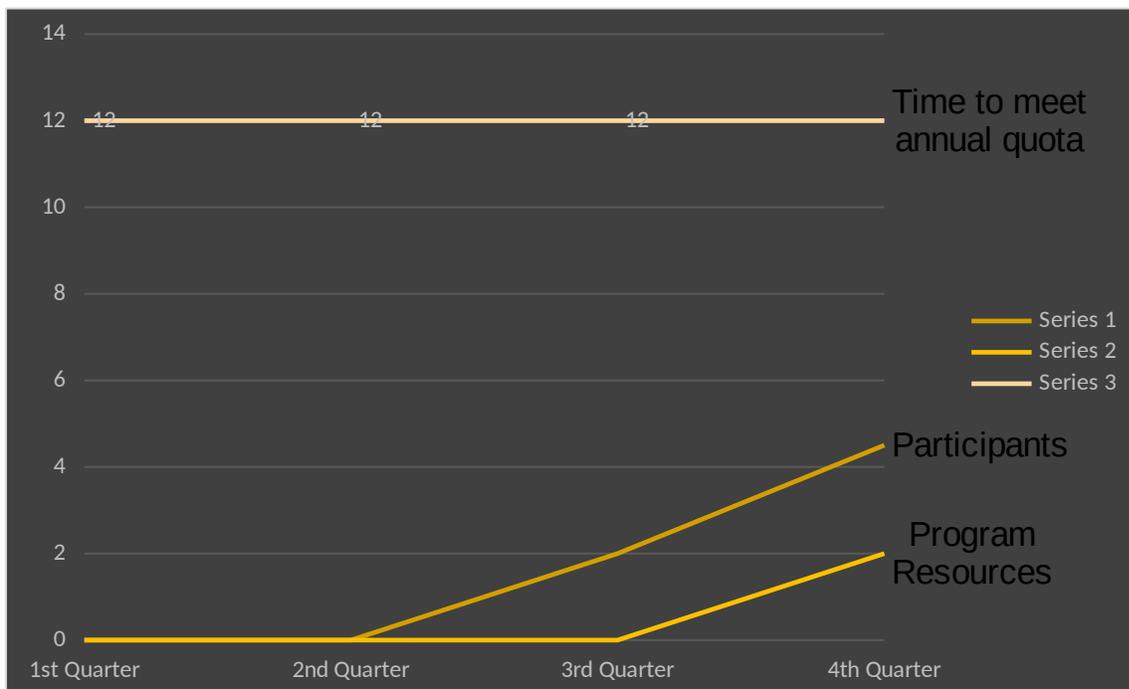
Example:

The fight against Cancer.

Systemic thinking requires utilizing a more detailed and comprehensive process when confronting these complex challenges. The question these organizations should ask themselves if after applying systemic thinking did, they see positive results? If not, then why? If they were, then what can they learn from the experience to help them replicate a successful paradigm? How can organizational empowerment become the norm?

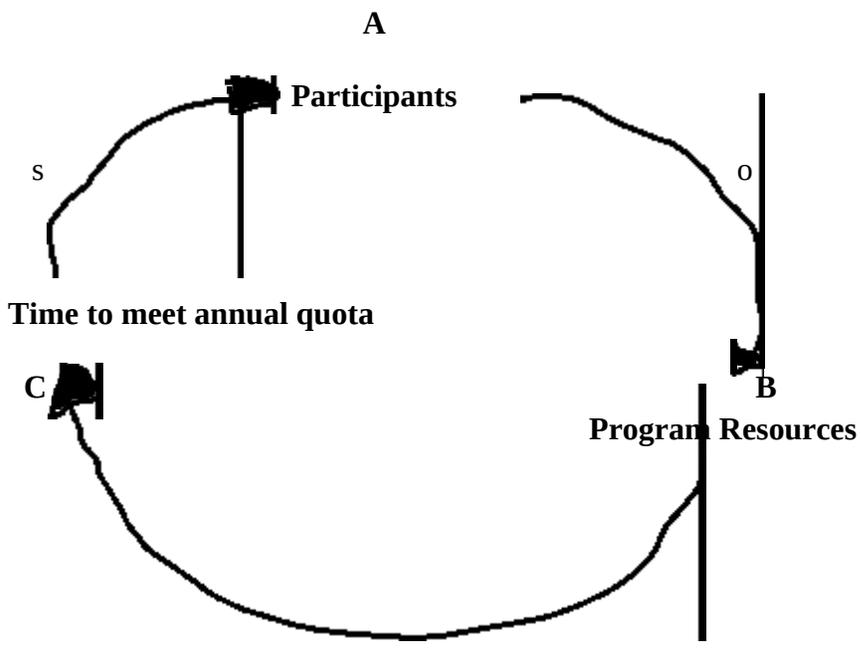
Another benefit from systemic thinking is having the opportunity to analyze the data in real time. By incorporating both BOT (Behavior Over Time) graphs and Causal Loop Diagrams (CLD) (See below), observers can make the necessary adjustments to those flaws within the system. Are these deficiencies the result of others flaws within the system? Are they the result of why other areas are succeeding while others are not? Critical questions can be asked to help explain why the organization is behaving the way that it is. This sophisticated manner at analyzing data is systemic thinking at its finest. Again, the goal is not to divide the system into sub-parts, while looking at each part as if it is the whole itself. Instead, each part is telling a unique story inside the same book. Sometimes you can read most of the chapters in a book and predict what the end will be. However, in systems thinking this tactic does not always work. In many instances, more research is required to investigate the source of the problem.

BOT Graph NeON Works Program



The BOT Graph depicts the NeON Works for the NeON Works Program. There are a total of three (3) variables: Time to meet annual quota, participants, and program resources. These variables interact, interrelate, and are interdependent upon one another. At this current pace, the participants are far exceeding program resources. By year's end, more participants will be in the program than were connected to resources. Consequently, the program will fail to meet its annual quota in a timely manner. My hypothesis is that a significant amount of participant's are being enrolled into the program but are not being connected to program resources. This hypothesis is based on overly aggressive recruitment and community outreach of potential participants. To prevent this from happening, I suggest putting a temporary hold on open enrollment, while increasing connection to available resources in the interim. As enrollment into program resources increases, then so should commencement of the enrollment process.

Causal Loop Diagram



This CLD is representative of the work-related events associated with the NeON Works Program. Variable (A) Participants are moving in the opposite direction to influence variable (B) Program Resources which in turn will have an impact on variable (C) Time to meet annual quota. However, instead of having a positive impact, it will have the opposite effect as described in the BOT Graph. Thus, this CLD is a negative feedback loop because we must adjust our workforce output. The short-term consequences will continue to adversely impact the system if these changes are not addressed. As Senge describes, “inadequate capacity to satisfy demand can limit growth” (Senge 1985). Thus, if this problem persists, its unsustainability will prevent the system from functioning at its highest capacity.

In closing, critical, and systematic thinking are fundamentally sound principles designed to approach problem solving in a non-traditional fashion. While there are several ways to solve problems, systemic thinking has proven to be a reliable tool to help with overcoming many of the challenges we in the world are confronted with.

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