

Overview of Systems Thinking

Lecturer: Stephen Polyak, PhD

This lecture provides an overview of systems thinking. Systems thinking is about looking at and realizing the complexity and the interdependency of the systems in which we live and work. This topic is about “big picture thinking,” which is an essential skill for all managers and leaders.

In simple terms, systems thinking focuses on relationships and connections. We are all part of systems. Even our bodies are made up of systems, with all the parts working together to produce life! In its broadest sense, systems thinking is a framework that takes into account the interconnected nature of systems.

As defined by the Project Management Institute (PMI), Systems thinking is considering a system to be an interrelated and interdependent set of parts which is defined by its boundaries and is more than the sum of its parts (which are called subsystems). Changing one part of the system affects other parts and often ripples through the entire system.

Peter M. Senge, author of *The Fifth Discipline*, widely considered to be one of the foremost theorists on management and leadership from a systems perspective has said, “A system is a perceived whole whose elements ‘hang together’ because they continually affect each other over time and operate toward a common purpose.”

Systems thinking also involves considering feedback loops which tell you how a system behaves. This can be used to analyze specific situations to explain unexpected outcomes and behaviors. Systems thinking also helps us design interventions with an eye for potential unintended consequences.

What systems are you part of? We’re all raised to be part of a family system. You are part of this course—while we each learn individually; we also gather as a group and learn in a system. We’re all part of complex organizations where we work, and we’re part of community systems and the massive system of our countries and nations.

When you zoom out from the clinical laboratory, you quickly realize the laboratory itself is part of a larger healthcare information system that includes: doctors and nurses, pharmacies, ministries of health, health insurance systems, laboratories, regulators, hospital information systems, and so forth.

The goal of clinical laboratorians and clinical laboratories everywhere is simple: provide accurate and reliable clinical testing to improve the health of individuals and populations. It sounds simple and yet we all know it is anything but simple. The goal of constantly maintaining accurate and sensitive testing is often only achievable through the efforts of many people from many different disciplines—it is by nature highly complex. Such complexity is inherent in the clinical laboratory.

Acknowledging this, the question for us is: How can we best work to strengthen and improve clinical laboratories in these highly complex environments?

In this module, we'll talk about systems thinking as a practice for working in partnership with others, for working in complex environments, and for creating effective interventions to achieve the goal of accurate and sensitive testing.

Systems thinking can help us to comprehend the complexity and impacts of the various systems we work in. Complex systems are viewed as not being burdensome, but rather as opportunities by which we can improve how things are done. In fact, one of the main insights that I hope you'll take from this module is that complexity is not automatically a negative thing. And complexity is NOT the same thing as chaos. Systems are organized, even if complex. This is our reality. With the right approach, complexity can be seen as a fertile ground where we can find multiple options for how to approach a problem.

This is at the heart of systems thinking: that we're able to recognize complexity, embrace it, and work together across systems to find solutions and change outcomes.

Systems thinking tells us to attend to the relationships between the components of a system more than the components themselves. The challenge to keep in mind is that as the number of components increases the number of relationships between them dramatically increases as well..

Approaching complexity as a positive thing also supports the goal of building diverse and cross-functional teams. It also works well with building collaborative partnerships across multiple laboratories that might comprise a broad clinical diagnostic testing service.

Now, I'd like to go into more detail about systems thinking. According to Peter Senge, "Systems thinking encompasses a large and fairly amorphous body of methods, tools, and principles, all oriented to looking at the interrelatedness of forces and seeing them as part of a common process."

Senge is part of the revolution that encourages us to approach our work by acknowledging complexity rather than searching for singular, simple, cause-and-effect, answers. The general idea with systems thinking is to:

1. See the Whole Picture
2. Engage different perspectives
3. See New leverage points
4. Look for relationships and consequences
5. Think circularly rather than linearly
6. Embrace complex AND
7. Question assumptions

Put simply: Systems thinking is a thought and review process that fosters looking at the whole rather than the parts to understand an organization or situation.

For instance, let's imagine that a normally well-functioning clinical laboratory suddenly starts having quality control issues with their hemoglobin A1c test. If I were using simplistic thinking, sometimes called linear thinking (sometimes called event-oriented thinking), I would go from A (hemoglobin testing is off) to B (who messed up the test) to C (fire them). If I were to use systems or holistic thinking, I would start at A (hemoglobin testing is off) and go to D, E and F (What are the forces that allowed this to happen? Has something changed with manufacturer's of this test? Has instrumentation changed? How are our controls? Are they adequate?). These are questions from a systems thinking perspective. I skip the simplistic thinking of "who messed up" and "how soon can we get rid of that person."

The habit of systems thinking will make you a better problem-solver and will improve the systems you're working in in the long run. A working definition for those of us in the clinical laboratory sees systems thinking as an approach to problem-solving that views "problems" in the context of an overall system. It sees system thinking as a set of habits and practices based on the belief that the parts of a system are interrelated, not isolated. Systems thinking comprises a shift from a simple, linear, reductionist way of approaching a problem to one acknowledging complexity and multiple influences.

So, remember, when applying systems thinking, a system is a network of interdependent components that work together to try to accomplish the aim of the system. A system must have an aim. Without the aim, there is no system (Edwards Deming).

In this lecture, I laid the groundwork for the rest of the module by defining terms like system and systems thinking. In the rest of this module, you'll learn about the different approaches to health systems strengthening from the clinical laboratory perspective.

Let's finish this lecture with a quote from Edwards Deming, "A system must be managed. It will not manage itself. Left to themselves, components become selfish, competitive, independent profit centers, and thus destroy the system."