

## What Is Systems Thinking?

There are many ways of looking at systems thinking. It offers not only a set of tools, but also a framework for looking at issues as systemic wholes. For some people, it can even become a way of life! Systems thinking is a language, too, that offers a way to communicate about dynamic complexities and interdependencies. Most Western languages are linear—their basic sentence construction, noun-verb-noun, encourages a worldview of “x causes y.” Because of this, we tend to focus on linear causal relationships rather than circular or mutually causative ones. Yet many of the most vexing problems confronting managers and corporations today are caused by a web of interconnected, circular relationships. To enhance our understanding and communication of such problems, we need a language and a set of tools better suited to the task. This is where systems thinking comes in.

In this section, we examine the foundational principles of systems thinking in more detail, and explore the special qualities of systems thinking as a language. The learning activities at the end of the section will let you begin actually practicing systems thinking.

## THE PRINCIPLES OF SYSTEMS THINKING

In general, systems thinking is characterized by these principles:

- thinking of the “big picture”
- balancing short-term and long-term perspectives
- recognizing the dynamic, complex, and interdependent nature of systems
- taking into account both measurable and nonmeasurable factors
- remembering that we are all part of the systems in which we function, and that we each influence those systems even as we are being influenced by them

### The “Big Picture”

During stressful times, we tend to focus on the immediate, most pressing problem. With this narrow focus, we can perceive only the *effects* of changes elsewhere in the system. One of the disciplines of systems thinking, however, involves being able to step back from that immediate focus and look at the bigger picture. As you know, whatever problem you’re involved in right now is part of a larger system. To discover the source of a problem, you have to widen your focus to include that bigger system. With this wider perspective, you’re more likely to find a more effective solution.

For example, imagine that you work for a regional appliance distributor that is experiencing growing delays in providing timely service to its customers. As a manager in this company, you might be tempted to focus first on the service technicians, perhaps on the service order-taking system, or even on service-order dispatching. But take a step back. What if you knew that about six weeks before the service crisis started, the sales group had implemented an incentive program that included free set-up and installation of new appliances? To sell more appliances, the sales force encouraged customers to make service appointments as soon as their delivery dates were set. Then a service person could come out to install the appliance and make all the electrical and water connections. However, because the customer service department had not been informed of the incentive program, it had no opportunity to add staff to handle the installation incentive. With this wider view, you might conclude that the delays in providing customer service do not come from the customer service department, and you might choose a different path to solving the problem.

### Long Term, Short Term

How often does your organization expect to see results of its activities? In a year? A quarter? A week? In addition to checking the health of the company at these kinds of intervals, some businesses also make major strategic changes—such as cost-cutting campaigns, layoffs, new hiring, production increases—every time they check how the business is doing.

Yet systems thinking shows that behavior that leads to short-term success or that is prompted by short-term assessments can actually *hurt* long-term success. However, the point is not that the long-term view is “better” than the short-term view. After all, if a little boy runs out into traffic, grabbing him by the arm at risk of injuring his shoulder or startling him makes far more sense than moving slowly or speaking softly while a bus speeds down the street. In thinking about any decision, the best approach is to strike a balance, to consider short-term *and* long-term options and to look for the course of action that encompasses both. At the very least, try making your decisions by first thinking through their likely ramifications—both short term *and* long term.

Here’s an example: As a business grows, it may use consultants to handle its human resource and training functions. In the short run, this sensible business decision can bring in a high level of professional expertise. If the company decides that consulting help is getting too expensive, however, it will eventually move to develop its own in-house HR and training department. To balance the long and the short term, the company could phase in internal expertise at certain levels of revenue, sales volume, or staffing, and overlap internal and outside resources while the new staff members get their bearings.

Whether you’re focusing on the long term or the short term, the key is to be aware of all the potential impacts of whichever strategy you choose.

### ***Dynamic, Complex, and Interdependent***

When you look at the world systemically, it becomes clear that everything is dynamic, complex, and interdependent. Put another way: Things change all the time, life is messy, and everything is connected.

We may know all this. However, when we’re struggling with an overwhelming problem or an uncertain future, we tend to want to simplify things, create order, and work with one problem at a time. Systems thinking doesn’t advocate abandoning that approach altogether; instead, it reminds us that simplification, structure, and linear thinking have their limits, and can generate as many problems as they solve. The main point is that we need to be aware of all the system’s relationships—both within it and external to it.

### ***Measurable vs. Nonmeasurable Data***

Some organizations value quantitative (measurable) over qualitative (non-measurable) data. Others are just the opposite. Systems thinking encourages the use of both kinds of data, from measurable information such as sales figures and costs to harder-to-quantify information like morale and customer attitudes. Neither kind of data is better; both are important.

Systems thinking also alerts us to our tendency to “see” only what we measure. If we focus our measuring on morale, working relationships, and teamwork, we might miss the important signals that only statistics can show us. On the other hand, if we stay riveted on “the numbers,” on how many “widgets” go out the door, we could overlook an important, escalating conflict between the purchasing and the production departments.

### ***We Are Part of the System***

One of the more challenging systems thinking principles says that we usually contribute to our own problems. When we look at the big picture, over the long term, we often find that we've played some role in the problems facing us.

**Unintended consequences.** Sometimes the connection is simple—the problem plaguing us today is an unintended consequence of a solution we implemented yesterday. For example, to control costs, a bank manager decides to limit the number of tellers on Thursday evenings and Saturday mornings. Eventually, the manager notices that—surprise!—other banks seem to be getting all the customers who rely on having access to the bank during evenings and weekends.

**Assumptions.** Sometimes our assumptions are what get us into trouble. Imagine, for example, that you're the manager of Frank's Steak House, a restaurant that specializes in affordable family dining. You've noticed that business at the restaurant has flagged a bit for two or three months in a row. You conclude that this is an enduring trend, because you've read essays in the newspapers about a possible resurgence in the health of the national economy. People are feeling freer to dine at more expensive restaurants, you decide. To prepare Frank's to weather the new trend, you lay people off. However, demand bounces back a few months later, and you're forced to scramble to bring workers back. Some of these workers are rehired at higher pay than before, some on overtime. These kinds of assumptions about how the world works (also known as mental models) are powerful drivers of the decisions we make.

**Values and beliefs.** Deeply held values and beliefs can lock us into counterproductive ways of making decisions. The Cold War is a perfect example: As long as the U.S. and the former U.S.S.R. each firmly believed that the other was intent on annihilating its ideological enemy, the arms race was inevitable. Even worse, the longer the conflict continued, the harder it was to call it off. Both nations were highly invested in justifying their "saber-rattling" in the past, present, and future. In this case, too, mental models played a major role.

### ***SYSTEMS THINKING AS A SPECIAL LANGUAGE***

As a language, systems thinking has unique qualities that make it a valuable tool for discussing complex systemic issues:

- It emphasizes looking at wholes rather than parts, and stresses the role of interconnections. Most important, as we saw earlier, it recognizes that we are part of the systems in which we function, and that we therefore contribute to how those systems behave.

- It is a circular rather than linear language. In other words, it focuses on “closed interdependencies,” where  $x$  influences  $y$ ,  $y$  influences  $z$ , and  $z$  comes back around to influence  $x$ .
- It has a precise set of rules that reduce the ambiguities and miscommunications that can crop up when we talk with others about complex issues.
- It offers visual tools, such as causal loop diagrams and behavior over time graphs. These diagrams are rich in implications and insights. They also facilitate learning because they are graphic and therefore are often easier to remember than written words. Finally, they defuse the defensiveness that can arise in a discussion, because they emphasize the dynamics of a problem, not individual blame.
- It opens a window on our mental models, translating our individual perceptions into explicit pictures that can reveal subtle yet meaningful differences in viewpoints.

To sum up, the language of systems thinking offers a whole different way to communicate about the way we see the world, and to work together more productively on understanding and solving complex problems.





## LEARNING ACTIVITIES

In this section, each learning activity focuses on one or two systems principles. As with the Section 1 learning activities, the exercises here can be done either by yourself or with a group. If you are working with a group, focus on the activities that highlight principles you consider the most valuable for your organization. Keep in mind that some of the activities are active exercises; some are meant for individual reflection and group discussion—try to use a mix.

Finally, remember that there is no one right response to the exercises. The idea is to use your imagination, and to have some fun!

## ACTIVITY 1

## STRETCHING THE TIMELINE

**Purpose:** To think in “big picture” terms  
To consider both short-term and long-term perspectives on a problem  
To practice seeing patterns and trends in a problem  
To identify the roots of a current problem

**Outcome:** A timeline showing the history of a current problem  
Insights about recurring patterns in an organization

**Number:** Minimum 1; maximum about 15

**Equipment:** For self-study: A white board or a couple of flip-chart pages and colored markers  
For a group: Colored yarn, pushpins or tape, several pairs of scissors, and a large wall or floor space OR long sheets of flip-chart paper, three or more colored markers for each person

**Space:** For a group, enough wall or floor space so that pairs or trios of people have at least six feet to themselves

STEPS

1. Lay your flip-chart paper on its side, horizontally, and position yourself near the far right end of the page. (You might even want to tape two flip-chart pages together horizontally, to give yourself lots of writing space.) If you are working at a white board, adapt the directions accordingly.
2. Identify a current problem or issue facing your immediate work group or department. If nothing comes to mind, use a problem within your family or community. Choose a moderate-size issue with which you have direct personal experience.

3. Make a mark on the paper to symbolize the present, and name the issue in one or two words.  
For example:

PRESENT  
X  
Sales  
dropping

4. To the best of your knowledge, when did this problem start? Pick a distance to the left across the paper that represents the amount of time you think has elapsed since the problem began. Mark the beginning point with your marker. Draw a line between the beginning point and the present. Write in the time span.

BEGINNING                      PRESENT  
← 6 months → X  
Sales  
dropping

5. Now project yourself back in time to the "Beginning" point. To the best of your knowledge, what was happening around that time to cause the beginning of the problem? Write your answer as a brief phrase, as shown in the example below.

BEGINNING                      PRESENT  
← 6 months → X  
New product  
late to market                      Sales  
dropping

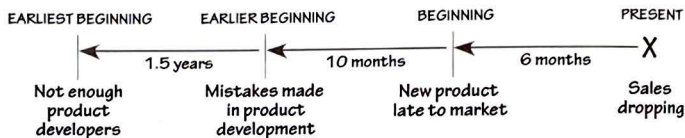
6. With a new marker color, extend your timeline even farther back in time, as shown below. Add a time span between "Earlier beginning" and "Beginning."

EARLIER BEGINNING                      BEGINNING                      PRESENT  
← 10 months → ← 6 months → X  
New product  
late to market                      Sales  
dropping

7. Now project yourself back once more, to "Earlier beginning." Think of what was happening at that point that led to the problem you wrote under "Beginning." Name it and mark it on the timeline in a third color.

EARLIER BEGINNING                      BEGINNING                      PRESENT  
← 10 months → ← 6 months → X  
Mistakes made  
in product  
development                      New product  
late to market                      Sales  
dropping

8. Continue the process one more time, by adding “Earliest beginning” as shown below. Add what was happening at *that* time, and fill in a time span between “Earliest beginning” and “Earlier beginning.”



9. Now imagine yourself present at any of the three beginning points you have identified. Is there anything else going on at that time that resembles the original problem you chose? Or is there another kind of problem that alternates with yours? Is there another problem going on in parallel to yours right now? (In the timeline boxes above, for example, maybe there was a hiring difficulty going on at the “Earliest beginning” stage of the problem.) If you can identify a parallel problem, add it to your timeline as a parallel line, using a distinctive color.
10. Now try one more step with your timeline. Instead of projecting backward in time, project forward. Given the sequence of events you’ve drawn, what do you expect to happen in the future if nothing is done about the problem? Add another piece of flip-chart paper if necessary, and extend your timeline to the right. Using a new marker color, add your thoughts about the future to this new part of your timeline.

### QUESTIONS

1. What was it like to create a visual image of the time and events surrounding the current problem you identified? Any surprises? Any insights? Write your thoughts below. If you worked on this activity with a group, discuss your insights together.
2. What did you learn?



3. If you were able to identify parallel problem timelines in Step 9, what did you learn?
4. If you were *not* able to trace back to earlier beginnings, what did you learn?
5. What helps you to see the “big picture” of your problem?
6. What obscures it?

## ACTIVITY 2

## THE SHAPE OF THE PROBLEM

**Purpose:** To explore the connections and interdependencies among the components of a problem  
To discover the intangible aspects of a problem  
To practice widening your view of a problem  
To see the complexity within a problem

**Outcomes:** A map of the connections and interdependencies of a problem  
Insights about the structure of the problem

**Number:** Minimum 1; maximum 20

**Equipment:** Flip-chart paper and three or four colored markers per person

**Space:** For groups, enough wall, floor, or table space for everyone to lay out a flip-chart page and draw

## STEPS

1. Identify a problem or an issue currently facing you or your immediate work group. (Your work group might be your department, division, unit, and so forth.) In the center of your flip-chart paper, draw a circle and write in the name of your group. Write one or two words to identify the issue you chose, as shown in the example in Figure 2.1, "The Center Circle."

**FIGURE 2.1**  
The Center Circle



2. Who else outside your group is directly involved in or affected by this issue? Write your answers within their own circles in a ring around your central issue. Connect each outer circle with the middle circle, similar to Figure 2.2, "The Circle Expands."

**FIGURE 2.2**  
The Circle Expands



3. Who is touched by each of the individuals or groups you identified in Step 2? Who is indirectly connected to your issue or problem? Don't forget families, friends, and other groups that can be affected when people are stressed, working overtime, excited by their successes, or receiving bonuses. Draw these people or groups into the picture and connect them to the appropriate circles, as in Figure 2.3, "Even More Connections."

FIGURE 2.3

## Even More Connections



4. If there are any other connections beyond what you've already drawn, map them in. The connections are not limited to human beings. They can include items such as "Revenues" or "Other Groups' Work." Your map can have as many circles or layers as make sense to you, as shown in Figure 2.4, "The Final Picture."

FIGURE 2.4

## The Final Picture



QUESTIONS

1. In your diagram, what happens to the *outer* circles when things are going well in the center circle? When they're not going well? Examples?
2. What happens to the *center* circle when things are going well in the other circles? When they're not going well? Examples?
3. Looking at the interconnections, can you see any ways in which something you do in the center circle causes a change in a connected circle that then comes back and affects the center circle? Examples?
4. Did you find it difficult to add many circles to your original circle? If so, what are some possible reasons for this difficulty?
5. If you worked on your map with others, discuss your insights together. If you worked with others, but each of you made your own map, exchange your maps and share the insights about the maps.

**ACTIVITY 3****IS TIME ON YOUR SIDE?**

- Purpose:** To think about how your organization sets goals, and how frequently it measures results  
To explore the impact of the time cycles involved in setting goals and measuring results
- Outcome:** Insights about how time frames influence what we pay attention to and what we accomplish
- Number:** Minimum 1; maximum as many as desired
- Equipment:** Flip chart and markers (optional)
- Instructions:** Reflect on the following questions, and discuss them with others if possible.

**QUESTIONS**

1. What is your organization's stated goal or mission? What is it trying to achieve? (State the mission as simply as possible. "Organization" can refer to your immediate work group, your division or department, or the overall organization.)
2. Is there a desired time frame for achieving the goal or mission? If so, what is it?
3. What results does the organization measure or pay attention to? (Examples: sales volume, revenue, meals served, passenger miles, return on assets, return to shareholders)
4. How often does the organization measure those results? (Examples: sales volume per quarter, meals served per week, passenger miles per vehicle, return on assets per year)
5. What goals does the organization have regarding what it measures? (Example: 2 percent sales growth per quarter)

- How long does the organization take to produce, create, or deliver what is measured? (Examples: selling groceries takes 5–10 minutes; selling a car takes 1 hour–2 weeks; selling a house takes 1 day–1 year; selling a large management-information system takes 6–18 months)
- What do you notice about the time frames for your organization's mission; for its target results; for its measurements; and for production, service, or delivery?
- What do you think are the effects of those time horizons?

#### ACTIVITY 4

#### FROM SHORT TERM TO LONG TERM

- Purpose:** To discover which aspects of your work are short term and which are long term
- Outcome:** Timelines of short-term and long-term events or outcomes
- Number:** Minimum 1; maximum as many as desired
- Equipment:** Flip-chart paper, tape, and markers OR lined paper and pens or pencils

#### Round 1: Your Organization—Short Term or Long Term?

**Instructions:** Write your answers to each question in the accompanying box.

#### QUESTIONS

- What is the shortest-term discrete product, service, or other deliverable from your organization? How long does it take to produce or deliver it?  
*Examples* ► A soft drink / 90 seconds to fill and serve  
A tank of gas / 5 minutes to fill  
A consultation / 1 hour  
An express package / 15 hours from pick-up to delivery  
A house / 4 months from ground-breaking to finished siding



**Shortest-term deliverable:**

**How long?**



2. What is the longest-term product, service, or other deliverable from your organization? How long does it take to produce or deliver it?

*Examples* ▶ A bridge / 3 years  
 A communication system / 18 months  
 A new management competency / 12 months

**Longest-term deliverable:**

**How long?**



3. What, if anything, falls into a middle-term length of time? How long does it take to produce or deliver it?

**Middle-term deliverable:**

**How long?**



4. How much of your routine work is spent on the short-term end of the spectrum? At the long-term end?

**% Short-term:**

**% Long-term:**



5. Looking at your answers, how would you define "short term" and "long term" in your organization?

6. How do you think your organization's sense of short and long term compares to other organizations? How does this sense differ? How is it similar?
7. Where is the emphasis in your organization—long term or short term? Why? What drives that focus?

### **Round 2: You—Short Term or Long Term?**

**Instructions:** In the space provided, jot down your responses to the following questions.

1. What do you want to accomplish today?
2. This week?
3. This month?
4. This year?
5. Within five years?

6. Within 10 years?

7. By the time you're very old?

8. Looking at your answers to the above questions, how would you define "short term" and "long term" in your own life? At what point is short term differentiated from long term?

9. How do you think your sense of short and long term compares to your organization's? How does this sense differ? How is it similar?

10. What do you emphasize in your own life—long term or short term? Why? What drives that focus?

11. When you made your list, was there a point at which your vision of what you want to accomplish shifted? If so, where, and how?
12. Do you think this kind of shift happens within your organization, too? If so, at what point in the timeline?

### ACTIVITY 5

### IN THE MIDST OF A PROBLEM

- Purpose:** To gain familiarity with the concepts of interconnectedness or interdependency  
To recognize the human tendency to assign blame
- Outcome:** Insights about our role in the problems we experience
- Number:** Minimum 1; maximum as many as desired
- Instructions:** Write your answers to the following questions in the space provided.

### QUESTIONS

1. Briefly describe a situation in which you knew that an individual or group having a problem was contributing to the problem, but wasn't aware of their contribution.

*Example >*

I used to work with someone, Valerie, who swore a lot at the office—really rough language. One day, she came in upset because her eight-year-old daughter, Nina, had been sent home from school for swearing. Valerie couldn't understand where Nina picked up this behavior! It was so obvious to the rest of us, but she just couldn't see it.

2. Now describe a situation in which you or your work group turned out to be contributing to your own problem.

*Example* >

I was experiencing deteriorating communications with a senior project team leader, Alan. I tried to clarify the relationship—I left him voice mails and got no response. I sent him memos and heard nothing back. Projects came up that I was perfect for, but Alan didn't include me. I was *furious* with him. When I finally managed to meet with him, I discovered that he was communicating less with me because he felt confident about our relationship and had other problems to take care of. My deluge of voice mails and memos made him think I was under a lot of stress, so when it came time to staff demanding projects, he decided to give me a break and leave me off. At the same time, though, Alan was beginning to wonder if I was becoming unreliable.

3. Consider a persistent, recurrent, or chronic problem you are experiencing now. Tell or record the story of the problem very briefly:

4. Now ask yourself:

- A. Is there any way you or your group may be causing or contributing to the problem?  
If so, how?

- B. Is there anything you did in the past that has generated an unintended consequence? If so, what?
- C. What might happen if you were to focus on the short-term aspects of the problem and ignore the longer term?
- D. Sometimes feedback comes to you slowly or in roundabout ways. What, if any, aspect of the problem might stem from delayed or indirect feedback?
5. Do you now have any new insights into your problem? If so, what are they?
6. What, if any, difference does it make to see the part you are playing in a problem?