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Causal Thinking Technique:
The CAUSAL LOOP DIAGRAM (CLD)

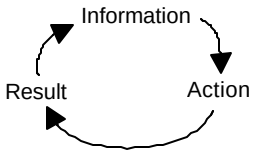
The causal loop diagramming technique described here has its roots in the discipline of "systems thinking," which is of almost universal value. In fact, VIS-IT™ Tools and Techniques were first developed to facilitate systems thinking within groups or teams. The term "system," as it is used below, refers to the environment in which there is a problem, an issue, or an opportunity we care about. Before the specific technique is described, however, we suggest that the first-time practitioner become acquainted with the following concepts.

Open Loop Thinking vs. Closed Loop Thinking

Instead of this:

The discipline of Systems Thinking requires that one take on a "Closed Loop" perspective.

Look for *feedback*



A Causal Loop Diagram (CLD) is an illustration of the "cause-effect-cause" relationships between the factors, which, over time, generate the dynamic behavior of the system being considered. As such, a CLD is a diagram that depicts the arrangement of the important parts of the structure of the system.

A Causal Link within a CLD is described by a single-head arrow, or "link", denoting the direction of causality between a cause and its effect(s). An "o" at the arrowhead means "opposite" causality, i.e., if the variable at the tail of the link goes *up*, the variable at the arrowhead will go *down*, and *vice versa*. If there is no "o" at the arrowhead, then if the variable at the tail of the link goes *up*, then the variable at the arrowhead will also go *up*; and if the variable at the tail of the link goes *down*, then the variable at the head of the link will also go *down*. To make this "same" relationship more explicit, some CLD diagrams will display an "s" at the arrowhead to indicate that the variables move in the "same" direction.

A Causal Loop is a Feedback Structure. A "loop" implies feedback, or circular causality. Simply put, we have a feedback loop in a CLD whenever we can begin with any variable and from there find any "one-way" path of arrows that brings us back to our starting point. Even in a relatively simple CLD, there can be a large number of feedback loops throughout the system, some with only two variables (the minimum) and some linking together many variables in the structure. A feedback loop is a "balancing loop" if there is an odd number of "opposite" causal

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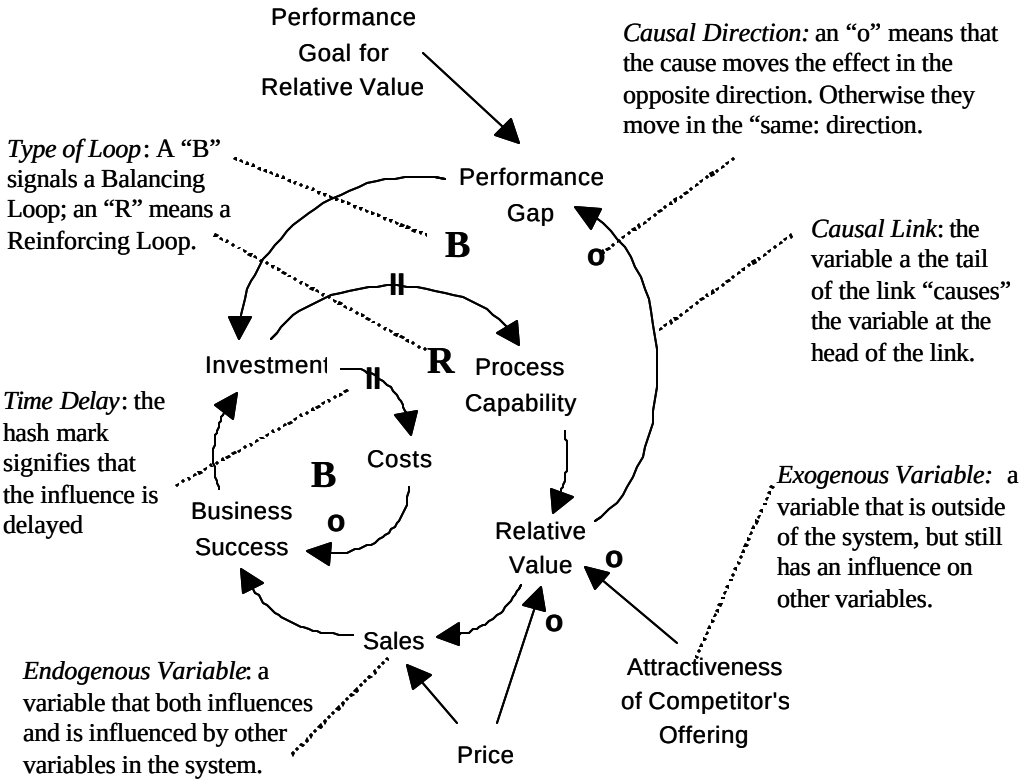
links (an “o” at an arrowhead) in the specified pathway. Otherwise, the feedback loop is a “reinforcing loop.” See the glossary of CLD terms below.

Causal Loop Diagram Vocabulary



The VIS-IT™ Technique for causal loop diagramming activities is described below.

Begin a CLD with a Behavior Chart, which shows how the “issue” variable has changed over time. The anchor for the CLD technique is a behavior chart of one or more of the key variables of the system. It need be no more than a simple sketch of how the variable(s) have changed up to the present time. The chart forces attention on the behavior pattern that the team is trying to understand and discover causes for. Further, the pattern itself reveals the nature of the dominant feedback loop that produced it. We suggest that you sketch out the variable’s pattern of behavior on **a Big Idea Pad** sheet or on a **Great Big Idea Pad** sheet, and position it for all to see.

Words in CLDs Must Be Variables, Not Events. Write variables on **hexagons** so that they can be arranged and rearranged easily. A CLD requires that its words or phrases be either nouns or noun phrases which represent something which can, at least conceptually, be measured and, thereby, exhibit change behavior over time. Thus, the “variables” in a CLD must be seen as something that could *rise or fall, grow or decline, or could increase or decrease*. Further,

use a variable name that conveys a "positive" sense, i.e., Satisfaction, not Dissatisfaction, to avoid confusion over causal direction notation.
An single "event" occurring at a specific time and place is not eligible for inclusion in a causal loop diagram because one event cannot represent a variable pattern of behavior over time. Events do, however, have certain, specific attributes or characteristics that can be measured, and which can vary over time as subsequent similar events occur. These attributes can be selected as variables to represent behavior patterns of the associated events.

Translating Hexagon Cluster Labels into CLD Variables: In VIS-IT idea processing activities, hexagon cluster labels frequently become variable names. These variables are used to initiate a causal loop diagram by teams who want to understand important relationships that emerge from their thinking together. In many instances, the cluster label is already something that is easily seen as a "variable". Examples of ready-to-use variables might be Customer Satisfaction, Innovative Products, or Investments. But in many other sessions, important, meaningful cluster labels are words or phrases like: Improve Customer Service, Encourage Leadership, Customer is King, Reduce Time to Market, or Must Make Dramatic Cost Reductions. Cluster labels like these, often beginning with a verbs or action phrases, convey ideas that work best in a CLD if they are translated into nouns or noun phrases, e.g., Quality of Customer Service, Quality of Leadership, Perceived Importance of the Customer, Time to Market, and Costs.

Use the CLD to Design Business and Organizational Systems: A CLD is like a schematic diagram drawn by an electronics engineer to depict how electric impulses behave and are controlled as they move through the circuits that make up an electronics system. The schematic is not the "product" itself, but is a blueprint used by others, like those in computer manufacturing companies, to guide the production or use of the product. In this sense, the schematic is a "model" of the real or proposed system. The electronics engineer may use a schematic to either document how existing circuits operate, or as a tool for designing a new or improved circuit system. The purpose of design work is to create a product or system that will, when used or operated, generate desired outcomes, or behavior patterns, in the present or future time. The CLD is a tool to understand and design complex business and organizational systems.

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