Visual Insights INFORMATION SHEET
TOC - Build your model

6.1 SYSTEMS THINKING: INTRODUCTION TO USING SYSTEMS THINKING CONCEPTS AND TOOLS FOR TOC

WHAT is SYSTEMS THINKING?

Systems thinking is a problem-solving approach and a way of making sense of the world beyond merely describing it. It is a sense-making process that organises the messiness of the real world into concepts and components that allow us to understand things a bit better though an understanding of context.

Analytical thinking provides knowledge by taking things apart, identifying the properties and the behaviours of the parts and putting them together into an understanding of the whole.

Systems thinking looks at what the combined properties are part of, explains the behaviour of the whole (system) and increases understanding of the whole by identifying the role of functions within. It takes the thing you want to understand and looks at what it is part of.

A system is a set of elements that is coherently organised and interconnected in a pattern or structure that produces a characteristic set of behaviours often classified as its "function" or "purpose". - Donella Meadows.

A system is made up of:

- Elements or all the separate parts
- The links between the parts – the processes, interrelationships and 'information flows'
- System function which is the least obvious part but most critical determinant of its behaviour
- The boundary which determines what is inside and outside of the system.

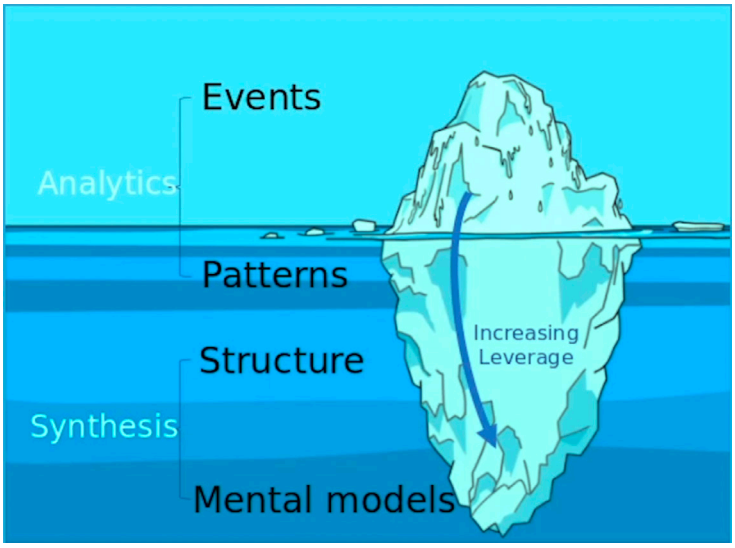
WHY use SYSTEMS THINKING in evaluation and TOC?

Both systems thinking and evaluation are in large part about:

1. Problem solving in complex settings
2. Developing a shared understanding among stakeholders.

Systems thinking brings some new tools for capturing complexity and we can use these for building evaluation models such as TOC and for solving problems at each stage of evaluation from planning to analysis and reporting.

How systems thinking can help the building of TOC models is demonstrated through the Iceberg model. At the top of the model are "Events" and just below the surface are "Patterns". We typically use events and patterns to build TOC through the basic methods of story (induction) and literature (deduction). This is the analytical thinking of quantifying events and patterns.



Systems thinking helps us work deeper below the surface of the iceberg. Structure and mental models and some patterns further below the surface of the iceberg are harder to see. Systems thinking tries to capture the structures, mental models and patterns that are harder to see and quantify. This includes values and cultures of organisations which are much further below the waterline and are more complex and harder to see. Understanding these elements provides more leverage in being able to understand why a system behaves the way it does.

HOW to use SYSTEMS THINKING in evaluation

Three of the major tools of systems thinking can be used to incorporate complexity into TOC models:

1. Interrelationships or interactions
2. Boundaries
3. Perspectives

Using these tools will help better understand, plan and communicate TOC for complex social problems and initiatives.

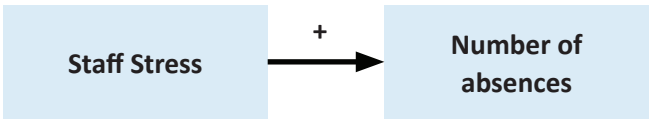
HOW to use SYSTEMS THINKING in evaluation... (cont)

1 INTERRELATIONSHIPS AND INTERACTIONS – USING CAUSAL LOOP DIAGRAMS

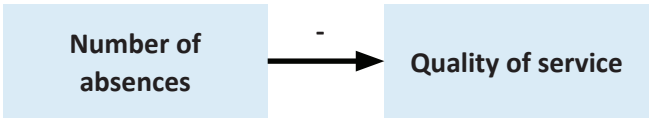
In this information sheet, we look at how causal loop diagrams from systems thinking can be used in TOC models.

Causal loop diagrams are made up of relationships between elements. In most cases for TOCs, elements will be outcomes. Two examples of relationships between outcomes are shown below.

A. Using the elements (or outcomes) of "staff stress" and "number of absences" can be shown in the simple relationship below. This shows a causal relationship between staff stress and number of absences. It is a positive relationship. Increase in staff stress will result in increased number of staff absences.



B. Using the elements (or outcomes) of "number of absences" and "quality of service" can be shown in the simple relationship below. Again it shows a causal relationship. But this time it is a negative relationship. Increase in "number of absences" will result in a decrease in "quality of service".



From these basic relationships, we introduce 2 main types of causal loops that are made up of connected outcomes in a TOC model:

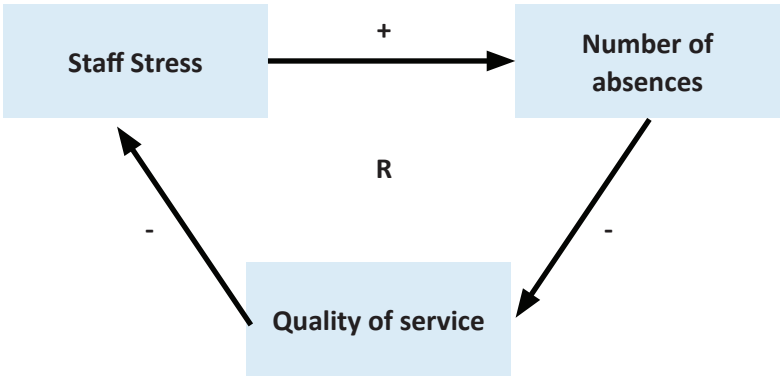
1. Reinforcing causal loops
2. Balancing causal loops.

HINT

Elements in causal loops are best if they do not have a direction. For example, use "staff stress" not "increased staff stress".

2 REINFORCING CAUSAL LOOPS

Reinforcing loops are such that action produces a result that influences more of the same action. The bigger the initial push, the bigger the consequential push. Reinforcing loops get things moving and build momentum. They occur when either all relationships are positive or "+" or all relationships are negative or "-". They also occur when there is an even number of "-" relationships. Below is an example of a reinforcing loop.



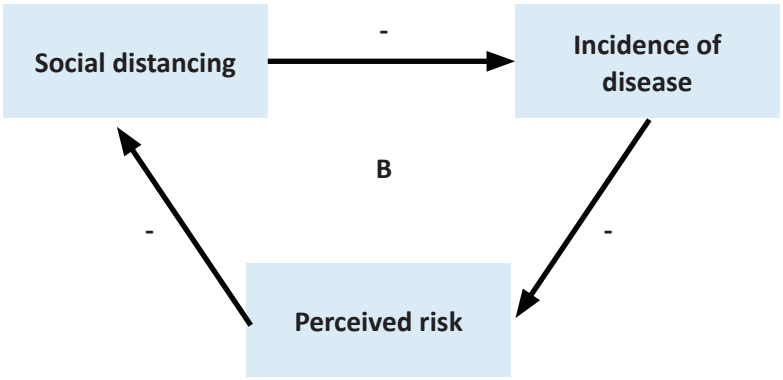
EXAMPLE: When staff stress increases, the number of staff absences increases. This results in a decrease in quality of service. This in turn has a negative impact on "staff stress" so that it continues to go in a negative direction (increase).

Reinforcing loops can be virtuous (have a positive outcome) or vicious (have a negative outcome). In our example above, the reinforcing loop is vicious. It has a negative outcome with "staff stress" continuing to get worse and worse as momentum builds.

HOW to use SYSTEMS THINKING in evaluation... (cont)

3 BALANCING CAUSAL LOOPS

Balancing loops are stabilising or stagnating. Early success undermines the process that led to the success. They bring stability to a system. These loops require continual energy input. It doesn't build momentum. Balancing loops always have an odd number of negative or "-" relationships. Below is an example of a balancing loop.



EXAMPLE: When social distancing happens, the incidence of disease decreases and when the incidence of disease decreases, the perceived risk decreases. So this results in a decrease in social distancing. This will result in an increase incidence of disease which will increase the perceived risk and then increase social distancing and then the incidence of disease will decrease again. So rather than building momentum, this loop results in a stagnation or stabilising of the outcomes.

RECOMMENDED RESOURCES

- Meadows , D. H., Wright, D. Thinking in Systems, Chelsea Green Publishing, Vermont, 2008.
- Williams B and Hummelbrunner R. Systems concepts in action: A practitioner's toolkit. Stanford University Press, California, 2009.