



SST 34 – Why We Need Diagnostics



Peter had been feeling unwell for several weeks. He was tired most of the time, struggled to concentrate at work, and occasionally experienced headaches. Concerned that something might be wrong, he visited his doctor.

When the doctor asked what the problem was, Peter described his symptoms. He explained how he felt, when the symptoms occurred, and how they were affecting his daily life. The doctor listened carefully and asked further questions.

At this stage, neither Peter nor the doctor knew exactly what was causing the problem. The symptoms suggested that something was wrong, but many different causes were possible. The problem might be stress, poor sleep, an infection, a dietary deficiency, or something else entirely.

Rather than immediately prescribing treatment, the doctor first tried to understand the situation. The symptoms provided clues, but more investigation was needed before an effective response could be chosen.

This process is called diagnosis.

The same approach is used in many areas of life. Engineers investigate symptoms before repairing machinery. Organisations investigate symptoms before introducing reforms. Governments investigate symptoms before introducing new policies. Before we can solve a problem, we first need to understand what kind of problem we are dealing with.



Formal Description

Systemic Diagnostics is a top-down process for assessing system condition through the use of viability dimensions and diagnostic indicators in order to identify areas requiring further investigation.

Diagnostics and explanation are complementary but distinct activities. Diagnostics identifies areas of concern and helps determine where investigation should be focused. Explanation seeks to identify the underlying causes responsible for the observed condition.

Plain English Explanation

Complex systems are often too complicated to analyse in their entirety. A modern organisation, city, economy, or society contains countless interacting people, processes, institutions, and resources. If a problem appears, it is usually impossible to investigate every possible cause immediately.

Instead, we begin by looking for signs that something may be wrong. These signs are often called symptoms or indicators. Symptoms do not tell us exactly what is causing a problem, but they help us recognise that a problem may exist and suggest where we should look more closely.

Imagine driving a car and noticing that the engine warning light has appeared. The warning light does not tell you precisely what has failed. It simply indicates that further investigation is required. A mechanic must then examine the vehicle to determine the underlying cause.

Social systems work in much the same way. Rising unemployment, declining trust, poor organisational performance, increasing waiting times, or falling educational attainment may all indicate underlying problems. However, none of these observations automatically reveal their causes.

Diagnostics therefore acts as the first stage in understanding a complex system. It helps us move from a general concern to a more focused investigation. Once areas of concern have been identified, more detailed methods such as Constraint Analysis can be used to investigate and explain why the observed conditions have arisen.



Example 1 – Medicine

A patient reports fatigue, headaches, and dizziness. These symptoms indicate that something may be wrong, but further investigation is required before the underlying cause can be identified.

Example 2 – Engineering

An engineer notices unusual vibration in a pump. The vibration indicates that a problem may exist, but the cause could be wear, misalignment, cavitation, or several other factors.

Example 3 – Government

A government observes rising public dissatisfaction. This may indicate deeper issues involving economic conditions, public services, trust, communication, or governance. Further investigation is needed before effective action can be taken.



Provenance and Links

The distinction between diagnosis and explanation appears across medicine, engineering, management, and systems science. Herbert Simon emphasised the importance of diagnosis when dealing with complex systems. Peter Checkland explored similar ideas through Soft Systems Methodology. Stafford Beer highlighted the importance of monitoring and feedback in viable systems.

This module extends these traditions by integrating diagnostics with Constraint Analysis. Diagnostics identifies where investigation should begin, while Constraint Analysis identifies the constraints responsible for the observed condition.

Practical Exercise

Think of an organisation, community, or public service that you know reasonably well.

1. Identify three symptoms that might indicate that the system is experiencing difficulties.
2. Explain why these symptoms alone do not necessarily reveal the underlying causes.
3. Describe what additional information you would seek before deciding what action to take.