GST 27 – Representation and Complexity

Formal Description

Representation is the process by which aspects of reality are modelled, described, or symbolised in forms that can be perceived, remembered, communicated, and reasoned about. Because reality contains vastly more detail than any observer can process directly, representation enables complexity to be simplified while preserving features relevant to understanding and action.

Plain English Explanation

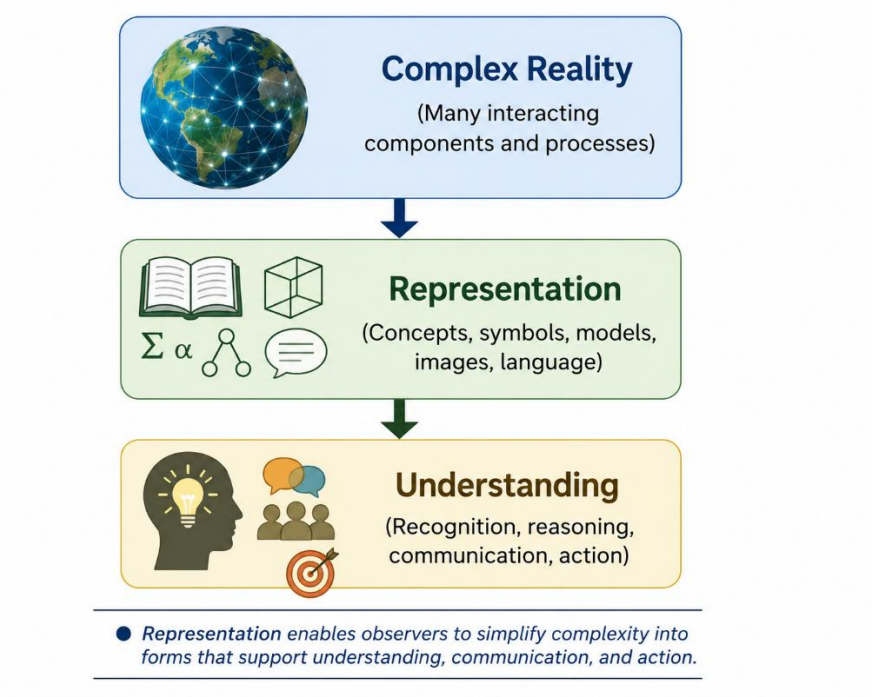
The world is far more complex than any person can fully comprehend. Even apparently simple things such as a tree, a car, or a family involve enormous numbers of interacting components and processes.

To cope with this complexity, humans and other organisms do not interact with reality directly in all its detail. Instead, they create representations. A representation is a simplified version of reality that captures the features that matter for a particular purpose.

A road map is a representation of a landscape. It does not show every tree, stone, or blade of grass. Instead, it highlights roads, towns, and other information useful for navigation.

The same principle applies to human thought. Concepts, images, words, diagrams, theories, and models are all forms of representation. They allow us to recognise patterns, communicate with others, solve problems, and make decisions without having to process every detail of reality.

Representation therefore acts as a bridge between complexity and understanding. Without it, cognition would be overwhelmed by information and effective action would be impossible.



Example 1 – Navigation
A road map is not the landscape itself. It is a simplified representation containing only the information needed to help travellers find their way.
Example 2 – Medicine
A doctor does not think about every individual cell in a patient's body. Instead, concepts such as infection, inflammation, or diabetes provide simplified representations that make diagnosis and treatment possible.
Example 3 – Everyday Life
When we refer to a "company," we treat thousands of people, buildings, technologies, contracts, and interactions as a single entity. The concept is a representation that simplifies a much more complex reality.

Provenance and Links
The importance of representation has been recognised in philosophy, psychology, linguistics, information theory, and systems science.
Relevant contributors include:

- Jerome Bruner – modes of representation and learning.
- Claude Shannon – information and communication.
- Herbert Simon – complexity and bounded rationality.
- Daniel Kahneman – cognition and simplified decision-making.
- Ludwig von Bertalanffy – systems and organised complexity.

Related topics include cognition, information, abstraction, modelling, systems theory, and communication.

Practical Exercise
Choose an object or system that you encounter regularly (for example, a school, a business, a football team, a river, or a family).

1. Describe the real system in a few sentences.
2. Identify at least three different representations of that system (for example, a diagram, a concept, a map, a set of statistics, or a written description).
3. Explain what each representation includes and what it leaves out.
4. Reflect on how the choice of representation influences understanding.