



GST 25 Ontological and Epistemic Information

Formal Description

This module distinguishes between information as an objective feature of physical reality and information as interpreted meaning within systems. It explains how physical information exists independently of observation or interpretation, while epistemic information arises when systems detect, process, and interpret recurring organisation. The module establishes the distinction between physical structure and meaning and prepares the basis for later discussions of cognition, communication, and social organisation.

Information may be understood in two distinct senses:

- ontological information; and
- epistemic information.

Ontological information consists of recurring causally organised pattern existing objectively within physical reality. It exists independently of observation, interpretation, cognition, or meaning. Epistemic information, by contrast, arises when physical information is detected, processed, represented, and interpreted by a system. This involves processes such as perception or measurement, encoding and representation, interpretation and evaluation, and communication. Through these processes, recurring physical organisation gives rise to meaningful content including signals, messages, beliefs, knowledge, and symbolic meaning. Meaning therefore does not exist inherently within physical information itself, but arises through interpretive processes within systems capable of processing information.

This distinction establishes a clear separation between information as physical organisation and information as interpreted content.

Plain English Explanation

A pattern or structure may exist physically whether or not anyone notices it.

For example:

- tree rings exist whether or not they are observed;
- DNA exists whether or not it is understood;
- and radio waves exist whether or not a receiver detects them.

This is ontological information: recurring organisation existing objectively in reality.

However, when a system detects and interprets that organisation, something new happens.

For example:

- a scientist interprets tree rings as evidence of climate history;
- a radio receiver converts wave patterns into sound;
- or a person interprets written symbols as language.

In these cases, physical information becomes epistemic information.

The physical organisation itself does not contain meaning inherently. Meaning arises because systems capable of interpretation process the information.

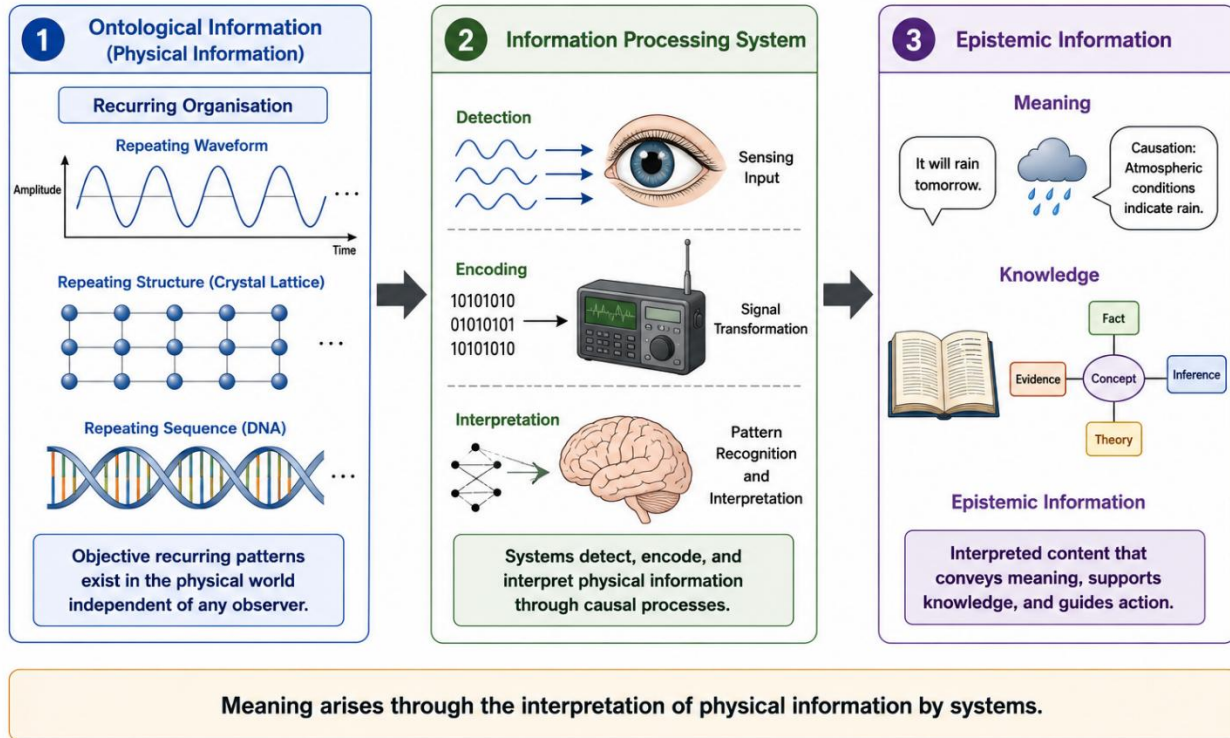
This distinction is important because it separates:

- the physical existence of information;
- from the interpretation and understanding of information.

Without this distinction, it becomes easy to confuse physical organisation with meaning itself.



From Physical Information to Meaning



Example 1 — Tree Rings

Tree rings contain recurring physical organisation regardless of whether anyone studies them. Scientific interpretation transforms this physical information into epistemic information.

Example 2 — Radio Waves

Radio waves exist physically as recurring electromagnetic organisation. A radio receiver interprets and transforms these patterns into sound.

Example 3 — Written Language

Written symbols consist physically of recurring patterns of marks or shapes. Meaning arises when a reader interprets them.

Example 4 — DNA

DNA contains recurring molecular organisation physically. Biological systems process and interpret this organisation functionally.

Provenance and Links

The distinction between ontological and epistemic information developed in this module draws particularly upon information theory, cognitive science, systems theory, the philosophy of information, and physicalist ontology. Shannon's (1948) work established the formal treatment of information as organised signal structure, while later theorists such as Bateson (1972) explored the relationship between information, difference, and cognition. Philosophical approaches to



information, particularly those of Floridi (2010), further distinguished between information as an objective feature of reality and information as meaningful or interpreted content. Cognitive science and systems theory have similarly examined how systems detect, process, encode, and interpret information through perception, representation, memory, and communication. The present framework builds directly upon earlier discussions of pattern, recurrence, information, and causal organisation by distinguishing between information as recurring physical organisation and epistemic information arising through interpretive processing within systems. This distinction preserves the objectivity of physical information while explaining how meaning, knowledge, and symbolic content emerge within cognitive and communicative systems. The module also prepares the conceptual basis for later discussions of cognition, communication, symbolic systems, social organisation, and epistemic constraint analysis.

Practical Exercise

- Explain the difference between ontological and epistemic information.
- Give three examples where physical information becomes interpreted meaning.
- Describe why meaning does not exist inherently within physical information.
- Explain how systems transform physical information into epistemic information.