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Theory of Information and Communication

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1.1 Data, Information and Knowledge



Information has attained unprecedented importance for society and everyone in the current era. In this landscape, advancements in all aspects of human life are closely tied to the ability to access and utilize information. This has led to a growing recognition of its value in problem-solving and decision-making, even as an economic asset.

Addressing the topic of information today involves understanding the relationship between the fundamental components of the triad: data, information, and knowledge. Given their close interconnection, scientific literature has analyzed these concepts from various perspectives, although each possesses distinctive characteristics.

Data is an essential element, a symbol, or a set of symbols devoid of intrinsic semantic content, limited exclusively to syntactic aspects. It is an alphanumeric representation or attribute that characterizes an action or event. Data can manifest as a number, a letter, hand signals, a punctuation mark, or any other symbol denoting a specific magnitude, measurement, or term.

Examples:

- -12 degrees
- 6 days
- Community of Madrid
- 2021

Therefore, data cannot be communicated. Instead, it provides the minimum unit on which information is based, as data is transformed into information when meaning is added. Data exists independently of the user or receiver of the data.

The concept of information has been studied by various disciplines, emphasizing its elusive and debated nature. There are countless interpretations of the term. Although its appearance in the intellectual sphere dates back to the 13th century, its widespread adoption only occurred in the 1950s of the 20th century. Information as a concept has the following characteristics:

- One of its properties is that it is inherent to the human being.
- It occurs in the realm of human relations.
- Principle for the formation and formalization of knowledge.
- The primary element for reaching science through research.
- Guide for the scientific method.
- Modifier, consciously or unconsciously, of the brain's evolutionary state.
- The process by which data are put into a situation to be used.
- Instrument of power.
- Raw material of creative and cognitive processes.
- It carries economic value and practical character.
- Intangible and recyclable.

Information presents a peculiar duality. It is objective in its presentation form, such as texts, images, or sounds, but subjective in its interpretation, which varies according to the individual who perceives it and their cultural context. It is characterized by having a meaning relative to the receiver arising from data processing to give it meaning. Information is a collection of organized, relevant data with meaning for the observer.

Information comes to life when an individual assigns utility to the data contained in a message, which modifies or confirms their state of knowledge. Its power lies in its ability to transform or reinforce what is known. Information can be defined by its effects on the receiver. It is generally presented as a message in textual, audiovisual, or digital

documents. To obtain information, both a sender and a receiver must exist, thus establishing a dynamic transmission relationship.

Building on the previous example about data, they can be turned into information by giving them meaning, such as:

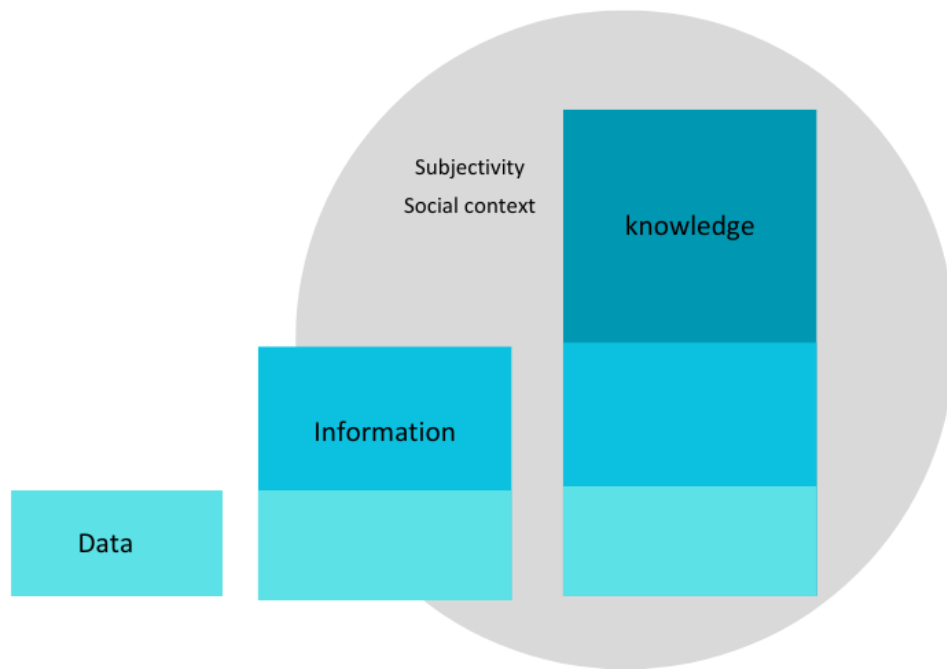
The historic snowstorm Filomena hit Madrid in January 2021, and the temperature dropped to -12 degrees Celsius, plunging the Community of Madrid into an unusual climate. This intense snowstorm, which lasted for six days, left a deep impression on the city and its inhabitants, marking a memorable event in the region's recent history.

Information is transformed into knowledge when individuals process, classify, and assimilate data according to the social context in which they operate. For example, for someone living in the Arctic Circle, a temperature of -12 degrees is not as significant as it is common in their environment, and they are prepared for long periods of snow. However, for the government of the Community of Madrid, where winter temperatures usually range between 6 and 12 degrees, a snow alert and temperatures below -5 degrees imply the mobilization of resources to prevent disasters in the city and avoid loss of life, especially after the experience with snowstorm Filomena and all the information available about it. In this context, information becomes valuable and practical knowledge for decision-making and emergency management.

Knowledge is commonly linked to mastery or understanding of a specific subject, manifested in shared knowledge within a particular culture, such as traditions, customs, language proficiency, or personal experiences. However, this phenomenon is not limited to these examples alone; knowledge plays a fundamental role in the individual's relationship with their environment, other individuals, and themselves.

Knowledge represents a set of information that individuals acquire about their environment and themselves. They use their senses and intellect to obtain this knowledge, using them to perceive the characteristics of objects and other individuals in their environment. This idea underscores the close relationship between knowledge and information, highlighting the former's dependence on the latter.

To approach the notions of information and knowledge appropriately, it is helpful to establish a hierarchy between the three concepts, where each level is based on the previous one. However, in processing information and its transformation into knowledge, it is essential to consider the cultural and social context of the individual interpreting the information, as this context significantly influences the process.



Information cannot automatically be considered knowledge; the latter arises through classifying and processing information. It is in the analysis and reflection on the obtained product where knowledge is gestated. In this process, data and information act as raw material, with the individual being the one who values, organizes, and transforms information into knowledge.

While information can be stored in various formats, such as digital or paper, knowledge cannot be recorded or printed. The latter is the result of the interpretation and processing of information by the subject, reflecting the properties and characteristics of objects in the individual's mind. Information becomes knowledge when it causes a modification in the structure of an individual's previous knowledge, thus demonstrating the evolution and deepening of their understanding of the world around them.