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Theory of Information and Communication

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2.1 Information and Communication: an introduction



Concept of Information

In topic 1.1, three essential notions were addressed to understand the theoretical foundations of the subject and information as the raw material of knowledge. It was pointed out that information is a set of structured data, socially contextualized, and capable of being recorded in any material medium (paper, magnetic disk, optical, etc.) and communicated. This leads to the understanding of information as a human and social phenomenon constructed from a subject who knows, thinks, feels, and interacts with the world around them and the community of subjects who communicate with each other. That is, information is not only explainable exclusively from its relationship with knowledge but also from other facets of interpersonal social existence and within systems.

The notion of informing derives from taking form: every event and occurrence in the world constitutes an informative phenomenon in which a form is determined for that energy. Information is not only present in documents. Every living being functions because its molecules and organs transmit information. Disciplines like biology also develop their theories about information.

The word "information" comes from the Latin "informatio," which means notion, idea, or representation. It is the materialization of knowledge for its utilization. (Küfer de Hanania, 1998)

According to its etymology, informing implies shaping, and information represents the measure of a message's originality. Information is data with meaning for the possessor, constituting a difference that helps reduce uncertainty and facilitates decision-making, problem-solving, and action. (Maidana, 2005)

Information is the quantum of impact received from the outside that modifies our state of knowledge. (Currás, 2010)

Santos (2022) has represented the different relationships of the concept of information that address different but interrelated problems: all are connected by the structure of systems and by space-time periods. The informational process manifests itself in each of the systems and their combination. This multiple manifestation of information can be found as:

- Magnitude in bits: the quantitative measure of message transmission from a sender to a receiver, influenced by noise factors.
- Selection and probability: information is only a probability that the selected message is appropriate for the system, both the sender's and receiver's selection. Information access points serve a selective function, similar to how users choose their needs.
- Observer's difference: the observer within the system distinguishes what is useful as information, distancing themselves from their environment.
- Meaning in interpretation: Information does not exist in pure form; to emanate from the system, it must be assigned significant value through interpretation.
- Organization in chaos: functionally, this is the primary task of information: organization. Amid the information explosion, order can only come from organization in repositories, catalogs, collections, lists, etc.
- Manifestation or representation: information is materialized through transmission codes, concepts through language, and measurement scales.
- Message in communication: a successfully delivered message reflects an effective information process.
- Reflection or reception: the transmission and preservation of organization – stemming from information – reflect the signal captured by the receiver.
- Sign or representamen: transmitted information is directed to a defined point, to a specific receiver, giving it symbolic value. Otherwise, there is no place for information.
- Communication and organization: a system of increasing complexity generates information for its organization through communication among its components.
- Adaptation and conservation: a system that maintains its conditions or, even when they change, preserves itself, is a producer of information internally, and exchanges it externally.

- Memory and record: systems leave traces of their presence, serving as information repositories, without which the human species would have no movement or permanence.
- Knowledge or certainty: this link sets the human system apart. The social system is the only one capable of developing new knowledge from information processes. The human need for certainty and stability drives its members to preserve memory and generate knowledge.

Information is a fundamental component in the structure and functioning of all biological, social, or technological systems. From its manifestation in bits to its interpretation and organization, information impacts decision-making, problem-solving, and human knowledge development. Its ability to transmit, transform, and store enables effective communication among individuals and preserves learning over time. Understanding the fundamental principles of information helps us better understand the world and adapt more effectively to our challenges in modern society.

Information and Communication

The relationship between information and communication has been explored and defined from physical perspectives, such as messages in electronic or digital systems, to philosophical approaches. However, these terms are closely intertwined, and examining information within a system without addressing communication is difficult.

Communication is an essential function of human beings, rooted in the Latin root *communis*, which denotes communion, participation, and community. More than individuals, people act in roles and assume different roles in interaction, which is reflected in communication as a unifying factor for social action and transformation, thus contributing to transparency. This process is not exclusive to the human species but arises in the evolution of certain species as an active capacity for interrelation among different actors using information. Communication manifests at various levels depending on the number of participants and the degree of an established relationship, involving interactions through signals, signs, and meaningful symbols, conveying information essential for culture and innovation.

Orality or oral communication is a communicative variant based on language, an essentially human possibility that results from complex biological and social circumstances. Therefore, mastering this form of communication enhances exchanging, transmitting, and receiving information in these early moments of human history.

Writing is another variant of communication. The origins of writing date back over 4000 years. Mesopotamia was its undisputed cradle, and in the various kingdoms of one or another part of this territorial space, the developing forms of writing and the first libraries created by humanity were developed. Due to its characteristics, this new communicative modification writing introduces a new element: the media, on which the information or data desired to be preserved or transmitted must be based. With this transformation, a transition is made from an acoustic culture, based on orality, to a scriptural culture, which did not imply the disappearance of the former but an authentic and necessary coexistence.

The first media of writing in this context were the famous clay tablets, on which the first books created by humanity were recorded. With this, an object arises, indissolubly linked to libraries, with a history as ancient as theirs: the book.

Communication is a dynamic and open process that involves the integrated interaction of cognitive, affective, and regulatory functions. It manifests as a complex system involving the transmission and reception of information among individuals or groups to share meanings, ideas, and emotions.

Characteristics of Communication:

1. Dynamic: Communication changes and evolves, adapting to circumstances and contexts.
2. Integrated: Cognitive, affective, and regulatory functions facilitate communication.
3. Open: It allows the input and output of information, enabling feedback and continuous interaction.
4. Interactive: It involves the active participation of interlocutors, who contribute to the flow of communication.

5. Multidirectional: It can occur in various directions, including vertical, horizontal, and diagonal, allowing the circulation of information among different levels and stakeholders.

Functions of Communication:

1. Cognitive: Involves the processing and understanding of transmitted information.
2. Affective: Includes the expression and perception of emotions, feelings, and attitudes during the communication process.
3. Regulatory: Facilitates the coordination and control of communicative interaction, establishing norms and guidelines for its development.

Types of Communication:

1. Verbal Communication: Uses spoken or written words and language to transmit information.
2. Nonverbal Communication: Includes gestures, facial expressions, postures, and tone of voice to communicate messages.
3. Interpersonal Communication: Occurs between individuals face-to-face, involving direct exchange of information.
4. Mass Communication: Directed at large audiences through mass media such as television, radio, or the internet.

Communication Barriers:

1. Physical Barriers: Physical obstacles such as distance, noise, or poor audio quality hinder communication.
2. Psychological Barriers: Factors such as prejudices, stereotypes, or negative emotions affect the message's perception and understanding.
3. Semantic Barriers: Differences in the meaning of words or terms can lead to misunderstandings or confusion in communication.

Díaz, Pérez-Montoro, and Salto (2010) explain that the informationalist conception of communication is based on the symbolic consideration of it and is strongly influenced by the Shannon and Weaver model. According to this view, human communication is a symbolic action in which a sender intentionally sends a message to a receiver through a channel to express meaning. The sender encodes this meaning into symbols or representations, whether verbal or non-verbal, which the receiver knows and can interpret. Upon receiving the message, the receiver identifies and decodes the signs using their knowledge of associated meanings. This interpretation alters the receiver's disposition towards behavior. In this process, the sender and receiver constantly exchange their roles, using contextual clues for proper message understanding. In summary, communicative processes are transactional, simultaneous, and interactive, where the sender and receiver mutually collaborate in message construction.

Society cannot be conceived without communication, which cannot be understood without language, the beginning and end of every communicative process in its deepest roots. From the moment he is born, it is the infinite ability of man to make himself understood by sending and receiving messages from subject to object and from object to concept. Human communication reaches its complete originality when exercised through language. Man thinks about the world through language and his worldview is determined by his language.

According to Capurro (2009), the information age has brought us new communication methods, especially through the Internet and digital technology. We no longer just read the information around us, but we all but can also create and share messages. This means we can all be writers and messengers in this digital world. However, for this communication to work well and be fair, we need devices that allow us to speak to each other horizontally, that is, without anyone having more power than others. The discussion about information in the 20th century has shown us

that it is essential for communication to be reciprocal and for everyone to be able to participate on equal terms. That is why the Internet is important, as it allows us to communicate more openly and democratically.

Types and Categories of Information

The categories of information outlined by Brajnovic (1979) hold significant value in analyzing and understanding how information is used and perceived in different contexts. Each category reflects specific aspects related to the purpose, content, audience, and quality of information. Below are the categories mentioned:

1. By scope, this classification allows understanding the context in which information is generated and disseminated. The distinction between journalistic, advertising, or propaganda information highlights how information is used in media and the promotion of ideas or products.
2. Different objectives behind the use of information are identified by purpose. Recognizing whether the information seeks to inform, persuade, or promote products can help evaluate its credibility and relevance.
3. By value, this category helps discern the utility and relevance of information for the recipient. Differentiating between necessary, useful, or superfluous information allows prioritizing attention and resources based on its importance.
4. The distinction between general and specialized information by recipient points to the diversity of audiences and their informational needs. This influences how information is presented and adapted to meet the expectations and knowledge of the target audience.
5. By content, identifying the information's content type highlights its nature and purpose. Classification into categories such as scientific, informative, etc., provides clues about the depth and rigor of the information presented.
6. By intentionality, recognizing whether the information is biased, formative, or harmful provides crucial information about its objectivity and reliability. This invites questioning the impartiality and potential interests behind the presented information.

These categories help evaluate and contextualize information, allowing individuals and society to make more informed and critical decisions about its relevance, credibility, and effect.

Cornella (2000), despite the distinction between the terms data, information, and knowledge, in everyday practice, they often intertwine into two fundamental categories of information:

1. Structured information refers to data or information with precise and defined answers. It arises from agreements on meanings or is based on pure data with a clear sense within the organizational context. For example, the exact number of inhabitants in Barcelona or the ranking of companies in the Spanish chemical sector, when previously agreed criteria are established examples of structured information.
2. Unstructured information: characterized by needing clear answers and requiring interpretation beyond agreements on meanings. Questions like Will the euro decrease interest rates? Do not have a precise answer due to the uncertainty of the future. Similarly, identifying potential markets involves complex and subjective analysis. Additionally, there is a particular type of unstructured information, rumors, which can significantly influence organizational perceptions and decisions, although they do not provide concrete data.