A Philosophical Reflection on Bates’ Definition of Information †

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Abstract: This paper will analyze Marcia Bates’ definition on information from four perspectives, overall philosophical standpoint, ontological position, epistemological position, and methodological position. The viewpoints of four information specialists (Luciano Floridi, Marcia Bates, Fred Dretske, and Kun Wu) will be compared in the paper as well. At last, we will find Bates’ position in the information study, and also the merit and demerit of her definition on information.

Keywords: philosophy of information; information science; anthropocentrism; naturalism

1. Introduction

Marcia Bates, an American information scientist, is committed to building an evolution model of a unified information science. This model revolves around the core concept of “information” and tries to provide paradigm guidance for unified information science from the naturalistic standpoint. However, different from Floridi’s information concepts system based on semantic information, the information concept mentioned by Bates has a unified nature. She believes “Within information science, it is desirable to develop an understanding of information that is applicable for the various senses in which researchers and practitioners need to talk about information [1].” It is in this goal and premise that Bates gives a unified definition of information, which not only attempts to cover the understanding of information in different disciplines, but also claims to govern the subjective and objective information. The following are the definitions of information [1] given by Bates.

Information 1: The pattern of organization of matter and energy.
Information 2: Some pattern of organization of matter and energy given meaning by a living being.

The creativity of Bates’ definition of information lies in her attempt to define information from the perspective of pattern, which is an objective existence. Therefore, Bates’s view is that information is unified in objectivity (i.e., information 1).

2. An Incomplete Position of Naturalism on Information

Floridi, on the other hand, holds the opposite view. In his view, information depends on the intelligent agent (or more specifically, the human subject) to exist. Without a human mind to give meaning to the object, there is no information [2]. This is an anthropocentric view.

To some extent, Bates’s view represents the position of naturalism, that is, information is a natural phenomenon that does not depend on human beings.

However, Bates’s naturalism is not rigorous, because when she talks about meaning, she falls into the position of anthropocentrism. In short, Bates not only admits the existence of objective information, but also advocates the unnaturalization of meaning.

Bates’s definition of information 1 makes it easily slide into the reductionism of information, reducing matter into information. However, her information 2 definition shows a position of anti-reductionism, advocating “meaning” is irreducible. That is to say,
in the theory of meaning, Bates and Floridi are in the same camp, and the latter believes that the only real information is subjective semantic information. Therefore, it can be seen that Bates naturally accepted the Cartesian tradition that “only cognitive subjects can give meaning”. This is incompatible with her assertive position that the information is unified in objectivity and the information is understood in the form of pattern.

Bates’s “pattern of organization” or information 1 is more like the pure data mentioned by Floridi, that is, the ubiquitous differences. Because the structure itself can be regarded as the differences of order. That’s why Bates said, “I would say that the information is the order in the system”.

Thus, we say that Bates holds an incomplete position of naturalism on information.

3. Ontological Position of Aristotle

In addition, from the definition of information based on pattern, we can see that Bates inherited the tradition of materialism and empiricism, which is rooted in Aristotle’s philosophy. In this view, the study of information presupposes the premise of material primacy.

Bates’ understanding of information makes her an epiphenomenologist of Aristotelianism. The epiphenomenon is a kind of phenomenon produced by the carrier, and its changes also depend on the carrier. And it itself cannot have causal effect on the carrier.

On this point, Bates is different from Aristotle. The latter holds that the form also has a power of regulation and guidance for the material carriers, which is the basis of the naturalization of meaning. Although there are some differences, the connotation and premise of Bates’ definition of information still accord with the basic demands of Aristotelian ontology. Therefore, we can still call it the ontological position of Aristotle. However, it is this difference that makes his position in epistemology face the gap of meaning, which will be discussed next.

4. Darwinism Position on Epistemology

In the following part, I will introduce Bates’ Darwinism position on epistemology, and how her knowledge evolution model fits Wu Kun’s information evolution hierarchy. Bates proposed an evolutionary hierarchy of information 1 → information 2 → data 1 → data 2 → knowledge. However, due to its anthropocentric position on the issue of meaning, its evolutionary position is facing a gap of meaning. That is an artificial evolutionary gap which is set up between information 1 and information 2 with the sudden emergence of meaning. In other words, there is a mysterious leap from objective information to subjective information, from meaningless data to meaningful information. If it was not the evolution, where did the human ability to give meaning comes from? If it was because of evolution, meaning would not suddenly appear here, but already exist in nature.

Dretske’s information semantics is to provide an interpretation scheme for the naturalization of meaning. Because of the same understanding of information as Dretske, Wu Kun’s information evolution level is a knowledge evolution process that can avoid the meaning gap: in-itself information → for-itself information → regenerated information → social information → knowledge. If Bates wants to avoid this gap of meaning, it needs to transform her definition of information.

After an analysis, we will not only find that the information defined by Bates is another expression of Wu Kun’s information definition, but also their knowledge evolution process is basically consistent.

5. The Research Method of System Science

According to her viewpoint, the pattern is the emergent and ordered state of the material system, it can be seen that Bates’ study is based on the research method of system science.

In the previous analysis, we learned that Bates understood information as a set of patterns. The understanding of the pattern adopts the emergence theory of system science.
Therefore, emergence theory is the methodological basis for Bates to unify the definition of information. In the previous analysis, we learned that Bates understood information as a set concept of patterns. The understanding of the pattern adopts the emergence theory of system science. Therefore, emergence theory is the methodological basis for Bates to unify the definition of information. As Bates hoped: “Perhaps we can find a way to think about information that effectively allows for both subjective and objective perspectives [1]”. Such a path is systematic holism.

6. Conclusions

At last, In the following diagram, I compare four positions on the information study (See in Table 1).

Table 1. Position comparisons in the information study.

| Name             | Position | Naturalism | Ontology       | Epistemology | Methodology            |
|------------------|----------|------------|----------------|--------------|------------------------|
| Marcia J. Bates  | Weak     | Aristotelianism | Darwinism    | Systematic Holism |
| Fred Dretske     | Strong   | Aristotelianism | Darwinism    | Inductive Logicalism |
| Kun Wu           | Moderate | Aristotelianism | Darwinism    | Dialectical Materialism |
| Luciano Floridi  | Non      | Platonism   | Constructivism | Computational Representationalism |

Through the philosophical reflection on Bates’ definition of information, we can understand the philosophical understanding of information by frontier information scientists, which is not only helpful for information philosophers to locate the conceptual misunderstanding and philosophical dilemma in frontier information science research, but also provides a plan for solving the problems in the paradigm of information science. Furthermore, it can also provide inspiration for the development of information philosophy.

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