

Abstract

Information Ecology and Information Studies[†]

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Abstract: Scientific methodology is widely accepted as macroscopic reflect of the scientific view on one hand and as the general approach to a certain class of research works on the other hand. Therefore, **methodology employment is extremely crucial in scientific research**. Whether the methodology employed in a field of research works is proper would, to a large extent, determine whether the achievements in the field of research could be made. However, there is no one single general methodology existed that can be applied to all fields of research with success. Which of the methodology should be employed in a certain field of research depends on which kind of phenomenon is studied. This paper will discuss the methodology consideration for information Studies.

Keywords: Scientific Methodology; Mechanical Reductionism; Information Ecology

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The age we are living in is a transitional period of history: from industrial age to information age, or from the age of classical physical science dominated to that of information science dominated. Due to the fact that information is different from matter, **the methodology of reductionist that has been very appropriate to the classical physics research is surely not appropriate to information science research**.

What is information? What is the methodology appropriate to the information research then?

Whenever mentioning the word ‘information’, one may instantaneously think of the concept in Shannon’s Information Theory ^[1], in which the concept of information has simply been understood as something that can be used for removing, or reducing, the users’ uncertainty on the statistical signal

waveform transmitted from the sender, and disturbed by noise from the channel, in communication system.

However, information exists everywhere and the process of information is far more than the process of communication. Researchers in the fields of information studies in the world, nowadays, would face much more complex process than communication and would therefore confirm that information is not that simple. In fact, information is a kind of complex phenomenon in reality. This fact does determine that the proper approach one can employ to the information studies, theoretical studies in particular, must be the one that is suitable for complex science.

The first aspect of the complexity embodied in information phenomenon is that there are two categories of information existed. One is generated by the object in physical world (both natural and man-made) which is termed **object information** and the other is generated by the subject which is named **perceived information**, as is seen in Fig.1 [2].

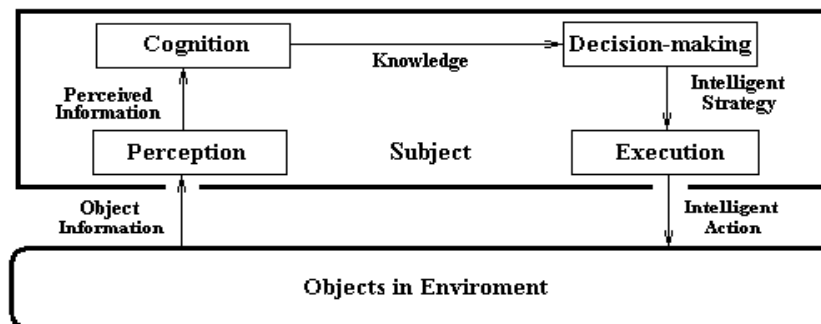


Fig.1 The Model of Information Ecology [2]

The lower part in Fig.1 stands for physical world and the upper part for the subject world. Normally, the perceived information has more complex attributes than the object information does this is because of the fact that the object information is dependent only on the object itself whereas the perceived information is dependent on both object and subject.

So, **we have two categories of information rather than one and they are always different. However, many people often overlook the difference** and consider the two categories with no distinction. This overlook often leads to the confusion: which category of information we are talking about? It is about the objective one, or it is about subjective one? More often than rare, among the group of discussants, some of them consider in their mind the object information while others consider in their mind the perceived information. Consequently, such group can never reach an agreement in understanding the concept of information during their discussion. It may also serve as the real cause for the extreme diversity in understanding the concept of information.

The second aspect of the complexity embodied in information phenomenon is that, different from the matter phenomenon in physical systems in which the matter as the object in research can be, and must be, completely separated from the observer/researcher so as to avoid the interference from the observer, yet **the object information (not to say the perceived information) cannot be completely separated from the subject but rather often interact in depth with the subject.** Those object

information, which has nothing to do with any subject, would be regarded as no significance for scientific study. This makes the information studies more complex ^[3].

The third aspect of the complexity embodied in information phenomenon is that **information is not a kind of invariant phenomenon, but rather it is a kind of dynamical, or ecological, phenomenon**. As a matter of fact, the most useful, and also the most meaningful, information phenomenon is the one that participates in the process of human subject-object interaction, within which the raw information will gradually be grown to knowledge (via cognition) and then to intelligence (via strategy creation, or equivalently decision-making) as its products, forming an ecological chain as can be clearly seen in Fig.1. This means that, as an entirety of information studies, one should not mere study raw information alone, but rather the entire ecological chain should be taken into account ^[4].

In other words, the scope of theoretical information study should include the properties of information and the principles for the conversion of information to knowledge and further to intelligence. This is because of the fact that what information can tell is all about the phenomenon in nature, what knowledge can tell is about the essence refined from the related class of phenomenon, and what intelligence can tell is about the strategy that can be used for problem solving. Thus, the purpose of information study should not only deal with the information but should more importantly deal with its products - the knowledge and the strategy for solving problems faced.

Note that “ecology” is the study of interrelations among organisms and their environment for better living ^[5], therefore, **the study of information-knowledge-intelligence conversion, or the study of the interrelations among information, knowledge, intelligence and their environment – the interaction between subject and object – can hence be defined as the methodology of information ecology**.

Considering all aspects stated above, we come to a conclusion that theoretical information studies should be regarded as a sort of complex science and that the old methodology, the reductionist doctrine, featured with ‘divide and conquer’, is no longer sufficient for this purpose. Rather, **the methodology of information ecology should be employed as the general guidelines for information studies** ^[6, 7].

The methodology of information ecology indicates that the theoretical studies of information should, at least, include the followings:

- Concept and properties of object information
- Concept and properties of perceived information
- Concept and properties of knowledge
- Concept and properties of intelligence
- Principle of conversion from object information to perceived information
- Principle of conversion from perceived information to knowledge
- Principle of conversion from perceived information and knowledge to intelligent strategy
- Principle of conversion from intelligent strategy to intelligent action

As matter of fact, many researchers are not satisfied with the results achieved so far in information studies. They have made great efforts in seeking the unification of information theory ^[2, 7, 8]. This is an absolutely right direction, of course. The author of the paper believes that only based, at least, on all these results mentioned above, could the unified theory of information be possible to establish in a proper way.

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