# Knowledge or Information

*- What makes the difference?*

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**Abstract:** In the past few years there has been an intensive debate about knowledge and knowledge management. One way to deal with knowledge and its management is by the use of information technology (IT). In this way organisations are supposed to record and store the workers' knowledge in databases and the like. From these so-called "knowledge systems" co-workers are supposed to obtain knowledge they need in order to do their work. However, what is really stored in those knowledge systems? Is it knowledge, or just information? What is the difference between knowledge and information? Is there always a difference? One related question concerns whether it is any difference between "having knowledge" and "having information"? This paper does not give any definitive answer to the questions stated but it elaborates on and gives a suggestion of how we may distinguish between the two notions.

**Key words:** Knowledge, Information, Signs.

## 1. INTRODUCTION

I consider knowledge as something developed in the mind and body of the knower. In addition, it is often argued that in our contemporary society knowledge is one of the most important assets of organisations. Drucker (1994:8, italics in original) even says that "the basic economic resource ... is no longer capital, nor natural resources (..), nor "labour". *It is and will be knowledge"*. By this statement (in particular: "nor labour") Drucker does not disregard the individuals. Quite the reverse, Drucker emphasises that knowledge is always embodied in a person. Therefore, nowadays it is the individuals who need to be put in the centre. Drucker also asserts that

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knowledge does not reside in books or in databases; those objects only contain *information*. Hereby, according to Drucker, knowledge is unquestioningly related to human beings.

What Drucker (1994) terms "information" can be compared with the notion of *public knowledge* (Boisot 1995), *explicit knowledge* (Nonaka and Takeuchi 1995), *objectified knowledge* (Spender 1996), or *codified knowledge* (Zack 1999). The question is if there is any difference between those forms of knowledge and information? If it is, *what makes the difference?* But if it is not so, *what makes not a difference?*

Another related interesting issue concerns the development and sharing of knowledge. In organisations humans develop and use knowledge in action. If one co-worker has developed some specific knowledge, how can this knowledge be transferred to other individuals? We can for example talk about knowledge transfer through face-to-face communication and immediate observation, but also by the use of documents and information technology (IT) (cf. Hansen *et al.* 1999). No matter how the transfer of knowledge is accomplished there is still one remaining question: *what is communicated when people expose and try to share knowledge with each other?* As an illustration of these matters, I would like to refer to a case study I have carried through within an IT-consulting firm (Braf 2000). One purpose of the study was to identify how knowledge was used, developed, and shared in the organisation, and the study focused on a specific team who delivered tailor-made business systems to the customers. The team had weekly meetings, which I thought were a very suitable forum to explore and share knowledge and experiences. However, all team members agreed that those meetings were mainly a way for the team boss to *inform* the co-workers about different issues. Thus, the team members meant that the meetings did not include any knowledge dissemination. This view reinforced my understanding that there is some difference between informing someone of something, and sharing knowledge. However, this calls for a clarification of the difference. An additional question concerns *if there is any difference between having knowledge – being knowledgeable – and having information – being informed.*

It would be an overstatement to say that this paper will give any definitive answers to the above questions. In a historical perspective, most of the above-mentioned issues have actually been around since the pre-Socratic philosophers. Still, I believe it is important to continue the dialogue and the analysis of how we can understand and approach knowledge and information in organisations. To do that we need to clarify the difference (if any) between knowledge and information, together with the difference between being knowledgeable and being informed.

Then, why is this important? My primary research interest is within the area of knowledge, organisational learning (OL), and knowledge management (KM), and in my point of view there are too many obscurities in the literature on KM and related subjects. Notions like knowledge and information are sometimes used carelessly and without enough reflection. As a consequence, some of the theories, models, and thoughts presented are quite abstract and hard to understand partly due to a confusion of ideas.

*The purpose of this paper is to contribute to the discourse concerning the understanding of knowledge and its distinction to information.* This is mainly a theoretical paper, which uses theories of semiotics and epistemology as sources of inspiration. My personal focus of knowledge is in organisational settings (i.e. knowledge as a basis for organisational action), which reflects my way of discussing the chosen issues.

The paper is divided into five parts. This introduction aims to give the reader a background and purpose of the area of interest. Next two parts comprise discussions around different meanings of information (part 2) and knowledge (part 3), which are found in some existing literature. In the fourth part I will present my view of different meanings of knowledge and information, together with some possible distinctions. In the fifth part I will sum up my discussion and make some final conclusions.

## 2. INFORMATION AND ITS DIFFERENT MEANINGS

As information technology (IT) has been developed, improved, and applied in organisations, information has become recognised as a basic resource in society (O'Brien 1996). The use of IT is considered a vital component of successful organisations. At the same time, the increased application of IT has also increased the amount of information available to organisations and their employees (Turban *et al.* 1999), even to the point of "information overload". A major challenge for our global information society is therefore to manage our information resources to benefit individuals while meeting the strategic goals of organisations and nations (O'Brien 1996). To that end, information systems (IS) are said to perform three vital roles in any type of organisation: 1) support of business operations, 2) support of managerial decision making, and 3) support of strategic competitive advantage (ibid). In this way IT can facilitate the access to information for organisations to make better decisions, to control the business performance, to follow up customer behaviour and the like.

One question is how the word "information" should be conceived? There are a large number of definitions of information and it would require a book-

collection to investigate those definitions. Therefore, I will be content with referring to just a few, still quite common ones.

Drucker (1991) says that information is data endowed with relevance and purpose. The conversion of data into information thus requires knowledge, and knowledge is specialised (ibid.). This definition is in line with O'Brien (1996:38), who defines information as "data[6] that has been converted into a meaningful and useful context for specific end users". Shortly, information can in this way be viewed as *processed data* (cf. also Keay 1969).

Turban *et al.* (1999) have a similar definition, and mean that one of the primary goals of an information system is to process data into information and knowledge. These authors refer to *data* as elementary descriptions of things, events, activities, and transactions that are recorded, classified, and stored but not organised to convey any specific meaning. They treat *information* as data that have been organised so that they deliver meaning and value to the recipient. Finally, they say that "*knowledge* is said to consists of data or information that have been organised and processed to convey *understanding, experience, accumulated learning,* and *expertise* as they apply to current problem or activity" (ibid:45, italics in original). The relations between data, information, and knowledge are often used in order to describe the meaning of and relation between the three words. Another definition comes from McCosh and Scott-Morton (1978) who say that information is pieces of knowledge, which may be used rationally in making a choice among alternatives by a decision maker who has the responsibility and authority to make that choice.

In spite of the great number of definitions that are available in order to explain the meaning of information (and data, and knowledge), the notion is still not very clear. I would actually say that the definitions stated above are more mystifying than clarifying. The major basis of my criticism is that the definitions leave us uncertain as to when information, data and knowledge exist (their ontological determination). Is each of them something said, something documented, or something known? In this connection it is fruitful to pay regard to well-known Ogden's triangle (Ogden and Richards 1956); an *expression* refers to *a phenomenon* and reflects some *meaning/thought.* The problem with the definitions above is that they do not clearly tell us whether they deal with what is expressed or the referent, or the thought.

Another remark concerns the description of data as having no meaning. However, how can data be without meaning? Data originate from someone, so one would expect these data have some meaning. Normally we assume

[6] Data is seen as raw facts or observations, typically about physical phenomena or business transactions (O'Brien 1996).

that all linguistic utterances (no matter whether they concern data, information, or knowledge) to have some *intended* meaning.

Compared with the quite ambiguous definitions above, a more comprehensive view of information can be found in Stamper (1973, 1996; 2001). Stamper (1996) criticises the definition of information as something obtained by processing data to produce meaning, and he presents an alternative approach to understand information. He asserts that information is unsuitable as a primitive notion on which to base a science and proposes instead to define information in various ways as a number of quite different properties of signs. This builds on the late 17th century Doctrine of Signs (see Locke 1959) and is inspired by Peirce (1931-35). Stamper says that a sign has at least three aspects: 1) some physical representation, 2) something to which this refers or alludes, and 3) somebody able to interpret this relationship[7]. A sign is defined, following Peirce, as something that stands to somebody for something in some respect or capacity, in some community or social context (ibid.).

Stamper (1996; 2001) illustrates a framework, called "the semiotic ladder", in order to understand different dimensions/levels (e.g. social, pragmatics, semantics, etc.) of signs[8], see figure 1 below. The notion of information is said to have many different usages and by using Stamper's framework those can be understood more easily. It should be noted that one starting-point for Stamper to develop his presented framework is that he means that we know much about IT but very little about the information IT carries. Therefore, in order to develop and apply IT in general, and IS in particular, we need to understand better the nature of its content, i.e. information.

| | | |
|---|---|---|
| *HUMAN* | **Social** - shared understanding<br>**Pragmatic** - intention<br>**Semantic** - meanings of sign-types | **VALUE** |
| *TECHNICAL* | **Syntactic** - forms of sign-types and manipulations on them<br>**Empirics** - statistics of *sets* of sign-tokens in use<br>**Material** - physics and economics of the phenomena that might serve for making signs | **COST** |

*Figure 1.* The semiotic ladder. Source: Stamper (2001).

[7] The combination of these aspects can be compared with Ogden's triangle (Ogden and Richards 1956).

[8] Stamper (1996) uses the framework in order to illustrate how the words "information", "meaning", and "communication" have different meanings on the various levels. However, in this article I concentrate on what he says about information.

At the *material level* signs stand for the physical form of tokens, e.g. signs in a database. The *empirical level* does not pay regard to the single sign-tokens but only the sets of tokens that can be used repeatedly. The *syntactic level* is concerned with the structures of complex signs, for example, defined by a syntax using names of syntactic categories and production rules.

In the frame of this paper the technical levels in figure 1 are not the most interesting ones. Still, there is one dimension that ought to be noticed; the material, empirical, and syntactical level of signs supply a technical platform that enables organisations and their employees to form, store, and disseminate tokens and symbols. In addition, Stamper's (1996) syntactic level (as formal structure, language, logic, data, records, files etc) seems to have something in common with above definitions of *data*. However, Stamper indicates that when defining categories and production rules (at the syntactic level) we can give signs a precise range of formal meanings. This is not in line with the definitions of data, which instead emphasise that data do not have any meaning (cf. my criticism above).

The *semantic level* is concerned with the capacity of sign-types to stand for other things. It deals with meaning in perhaps its most important sense, but as Stamper (2001) says the "meaning" itself, has many meanings. The specific meaning will always be relative to the interpreter. In order for a sign to be useful it must have an underlying *intention* that is imputed to the sign by its creator and its interpreter. Here we come to the next level – the *pragmatic* - and the crucial issue at this one is the relationship between signs and the behaviour of the involved (agents), and this all takes place in a specific social context. However, signs cannot be fully understood without regarding their potential or actual social consequences. Therefore, we need to consider the *social level* where we can examine what signs do. Stamper (2001) says that at this level signs are interpreted by individuals, resulting in changing, or confirming of some of the individuals' knowledge. Hereby, the focus at the social level is on the actual effects of the messages, while pragmatically it is on the intended effects[9].

Looking at the human part of the semiotic ladder the first level deals with *meaning* of different sign-types. As I understand this, the sign "A" can, for example, stand for 1) the first letter in the alphabet, 2) one, or 3) for a student's mark in a course. In this way we can consider signs as *objects* that can have different meanings. Then, at the next level (the pragmatic) information is about a *process* of informing, i.e. an actor (or an IS) communicates something specific to someone else. This explanation is in

[9] This strict division has been questioned (for further discission see Goldkuhl and Ågerfalk 2000).

line with the origin of the word information that comes from Latin *informare,* i.e. give shape to, describe (Thompson 1995). In other words (which is important for my analysis), the etymology of the word information is the verb, not the noun. Then, at the social level, the receiver interprets the information communicated, and gets informed. This means that this level deals with the *result* of the informing processes. The result "to get informed" can be compared to Langefors' (1993) idea that information is something we get to know, i.e. the receiver gets to know something new. However, someone can also get information about something he/she already knew. Thus, "to get informed" have two functions: 1) to *get to know* something *new*, or 2) to *confirm* something *already known.*

In summary, the word "information" has several meanings that all depend on the context and ontological level in question. By using the human part of the semiotic ladder I have identified three different functions (meanings) of information (as an object, process, and as a result) which I consider being of great interest for understanding the word information, and for the continuous investigation of the difference between information and knowledge.

## 3. KNOWLEDGE AND ITS DIFFERENT FUNCTIONS

In the ongoing debate, knowledge is considered to be the most important factor for production and competitiveness (see for example Drucker 1994; Nonaka and Takeuchi 1995; Roos and von Krogh 1996; Quintas *et al.*1997; Klein 1998; Koulopoulos and Frappaolo 1999). I support this view; knowledge is what makes people able to perform actions, and in this way we can say that knowledge is what makes organisations work[10]. It is also said that work in general becomes more and more knowledge-dependent (Zuboff 1988). Organisations are being more dependent on their ability to acquire and apply new knowledge in the business performance (Wikström and Normann 1994), together with the ability to reuse and take advantage of already existing knowledge (Wheelwright and Clark 1992; Ayas 1997).

Viewing knowledge as a critical asset implies efforts to utilise, improve, and disseminate knowledge in the organisation. How then is this done? Hansen *et al.* (1999) say that organisations need to choose one of two strategies: the *codification strategy* or the *personalisation strategy.* The first

[10] However, we cannot disregard other resources, like artefacts and routines. It is the *coordination* and the *interplay* between an organisation's prerequisites that makes the business competitive. For further discussion see Goldkuhl and Braf (2000).

one focuses on storing and disseminating knowledge by the use of IT, while the latter is focusing on sharing knowledge through personal contacts. One question of concern is what can be found in a database, and what is transferred when people talk with each other? Is it knowledge, or is it just information? And what are the real differences between these types of disseminations?

One of the most common concepts of knowledge, which is found in the KM-related literature, builds on Polanyi's (1966) distinction between explicit and tacit knowledge. *Explicit knowledge* refers to knowledge that can be articulated in formal language and transmitted across individuals formally and easily (Nonaka and Takeuchi 1995). Allee (1997:45) exemplifies this by declaring, "explicit knowledge is conveyed through documents, images, and other deliberate communications processes". This property, i.e. the possibility of knowledge being transmitted through documents and the like, indicates that there might be a close connection between (explicit) knowledge and information. Mårtensson (1999) explicitly takes that stance and equates *explicit knowledge* and *information.*

To continue with the notion of *tacit knowledge*, this is described as personal and context-specific knowledge that is hard to formalise and communicate. In other words, tacit knowledge is difficult to articulate by using language (Nonaka and Takeuchi 1995). Davenport and Prusak (1998:70) even say that tacit knowledge is "almost impossible to reproduce in a document or database". Still, it is argued that tacit knowledge is the most important kind of knowledge, and one aim of Nonaka and Takeuchi's (1995) theory of organisational knowledge creation is to transform tacit into explicit knowledge.

It seems that tacit knowledge resides in the brains of human beings, while explicit knowledge is something that can exist independently of any subjective holder. This is in line with Wikström and Normann (1994) who mean that knowledge can be both dependent and independent of individuals. In this way explicit knowledge could be placed on an equal footing with Popper's (1979) view of objective knowledge. However, knowledge without any holder appears to have been reified, and the fundamental question is if we really can call that knowledge? Tengström (1998) and Drucker (1994) assert that knowledge is always dependent on the holder, otherwise it is just information. This view is shared by Stamper (2001) who says that signs interpreted, at the social level of the semiotic ladder, are knowledge, and knowledge is equated with norms and attitudes.

Going back to the origin the word "knowledge", one early epistemological philosopher who has put forward a distinct approach to knowledge is Aristotle (1947). Aristotle builds on Plato's definition of knowledge, which is said to be *true, justified beliefs*. In a strict sense this

form of knowledge is theoretical-scientific knowledge (*episteme*) and represents *knowledge about something*. *Techne* is another form of knowledge that Aristotle presents, which concerns skills and ability to do something (Aristotle 1947). While *episteme* comes from true, justified beliefs, *techne* emanates from what we do, i.e. individuals' actions. Thus *techne* is connected to a pragmatic dimension of knowledge. The third form of knowledge Aristotle talks about is *phronesis*, which is also a form of practical knowledge that has its starting-point in knowledge-in-action, just as *techne* is. *Phronesis* concerns practical sense making and aims at enhancing humans' well being. Hereby, *phronesis* includes both political and ethical dimensions.

I believe that this trisecting of knowledge originally made by Aristotle constitutes a fruitful source in order to get a better understanding of how we can perceive knowledge. However, one should not interpret those forms of knowledge as having distinct demarcations. Instead, they are both overlapping and uniting with each other.

If we look at the three forms of knowledge, they have been used as foundations for several different epistemological approaches. For example, Popper (1979) asserts that knowledge in its objective (and for science the only interesting) sense is knowledge without anyone who knows, i.e. knowledge without a knowing subject. This view of knowledge might be equivalent to *episteme*. *Techne*, on the other hand, represents the pragmatic tradition of knowledge and one author who has asserted this approach is Peirce (1931-35). When it comes to *phronesis*, it is, above all, concerned with individual, long, practical experience of life.

Here we come back to the question whether knowledge is always subject-related, or if knowledge could take the shape of an object. One interpretation of *episteme* is that this form of knowledge can be viewed as an object and has thereby been reified. However, my understanding is that knowledge is always something that is carried by humans in the sense that it is humans who interpret, understand, and use knowledge. The interpretation, understanding, and use of knowledge are different knowledge-focused processes. In this way knowledge is often, if not always, related to a specific context (cf. Schutz and Luckmann 1973). Nevertheless, knowledge is not exclusively situated or completely bound to its context. Individuals can normally dissociate themselves from any knowledge and subject it to examination (Polanyi 1966). In this way one can say that the knowledge can be an object for reflection, but still someone holds the knowledge. In order to reflect on knowledge it helps if the knowledge is articulated. Articulated knowledge can be described both in writing and orally. In this connection we can link to Schutz and Luckmann (1973:100) who say that "articulation of experiences is decisive in the construction of the stock of knowledge, just as,

on the other hand, the present stock of knowledge enters into orientation with the situation; it allows mastery of these experiences".

Then what about descriptions of knowledge that aim to transfer knowledge between individuals? According to Schutz and Luckmann (1973), one person's subjective knowledge can be translated into signs and through them transmitted to another person. This requires, however, that the two parties share the same sign system, e.g. a common language. What needs to be emphasised is that knowledge descriptions should not be considered as knowledge *per se*, it is just representations of someone's personal knowledge. The translation of objective knowledge to subjective knowledge within the receiver always requires interpretation, understanding, and the use of language.

## 4. KNOWLEDGE VERSUS INFORMATION

In the above sections I have presented some different views of information and knowledge, together with some of my own standpoints. So far, we still don't have any clear distinction between the two notions. In this connection I would like to make a confession concerning my understanding of the matter in hand. In the beginning, while working with this paper I searched for *the* difference between information and knowledge. Gradually, I realised that there is no single, general definition or distinction to be made. There rather seems to be various differences together with similarities between the two notions. The rest of this paper will be devoted to identifying, at least, some of the differences and similarities. When doing this I will bear one specific question in mind: Which *meaningful* differences should we maintain, and what situations make the differences important?

### 4.1 Comments on the view of information and knowledge

As I have mentioned in part 2 above, definitions need to pay attention to the ontological level in question. Looking at definitions of information this issue is often missed and that results in quite ambiguous descriptions. One example is when using the word information it is seldom clear whether it concerns the noun (i.e. information in the form of a message), or the process of informing, or the state of being informed, i.e. the result of the process. In addition, some authors imply that information is a subclass to knowledge. For example, according to Wikström and Normann (1994) *information* is simple, fragmented *knowledge*, and they mean that it is in line with our

contemporary language usage to regard information as part of the knowledge concept.

Tengström (1998) takes an opposite view and criticises the attempt to erase the difference between knowledge and information. He says that there is a big difference because knowledge only resides within humans while information can be stored on papers and the like. Tengström's view is in line with Drucker (1994) who says that written descriptions of knowledge is just information. Hereby information (in the form of messages and knowledge descriptions) takes the shape of being an object that can be handled independently by the initial holder. However, this so-called information-object is just a sign representation on the semantic level in the semiotic ladder. Therefore, we need to pay regard to the other functions of information (i.e. the process and its result), and put them in relation to knowledge.

Moreover, in order to understand written or orally delivered information (or knowledge descriptions) there is a need for interpretation by the receiver (cf. Schutz and Luckmann 1973). Here, we come back to the question about the difference between "*being knowledgeable*" and "*being informed*". This is the other focus of further investigation. The next part illustrates different categories of knowledge that I believe can be used partly to clarify different characteristics of knowledge, and partly as a basis for comparing the words "information" and "knowledge".

## 4.2 Knowledge for, in, and through action

I am primarily interested in knowledge in organisational settings, so that is what I shall deal with here. Figure 2 below illustrates the different characteristics of knowledge that I believe are important for organisations and connects them to Aristotle's epistemology.

One of the most important thoughts underlying my approach is that it is not enough for organisations and their co-workers to just have *knowledge about* things (cf. *episteme*). They need to have *knowledge for* action (cf. *techne*). Knowledge in the form of *techne* is a prerequisite for all kinds of operations. Some *episteme* might be *techne* if the knowledge (*episteme*) is directly applicable in action, otherwise some *episteme* might be able to be translated or modified to *techne*. In this way *episteme* is general knowledge, while *techne* is situated knowledge, i.e. knowledge in relation to a specific context. If a worker needs and uses *techne*, this knowledge will very likely be used *in* action. In the figure the verb knowing is used to explain the characteristics of knowledge. The reason is that the noun knowledge can sometimes be misleading, and I want to emphasise that knowledge is, in my view, not an object it is rather a state and/or a process.

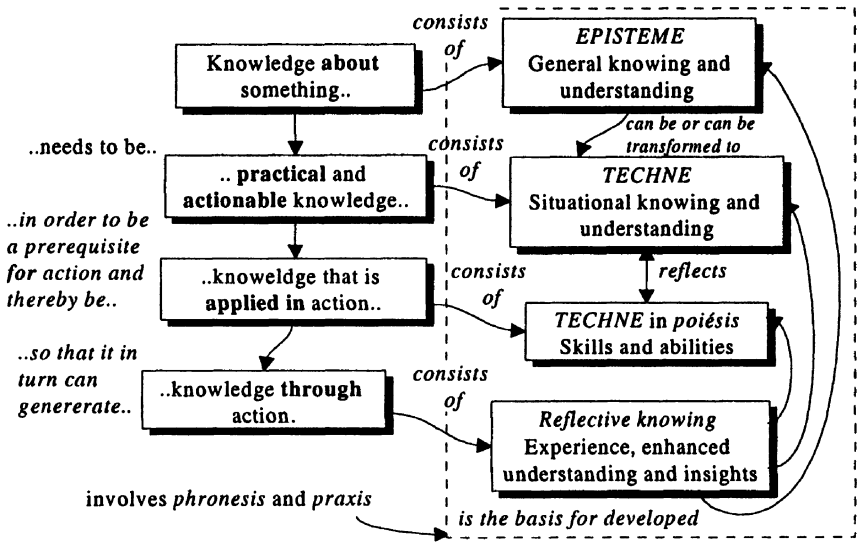


*Figure 2.* Characteristics of organisational knowledge and their relation to action.

*Poiésis* is one of two kinds of actions that Aristotle (1947) has put forward. *Poiésis* is an action that focuses on the production and creation of the end result, which in an organisation represents the goods and/or services. In this way *poiésis* represents organisations' core activities. The other form of action is *praxis*, which can be interpreted as actions that aim at creating better conditions for life. I consider *praxis* being focused on prerequisites and the being itself. In an organisation *praxis* can be compared to the actions that aims to create and maintain valid values and norms. Hereby, *praxis* is closely connected to *phronesis*.

In order to take care of *knowledge through* action the actors need to reflect on it. It lies near at hand to suggest that knowledge through action can be equated to *phronesis*. My interpretation of Aristotle is that *phronesis* concerns to a high degree the reflection of experiences and personal visions (cf. mental models, and personal mastery, Senge 1990). In this way it is a form of knowledge that makes people more secure and inspired by life itself and what they are doing with it. However, I believe that the reflection is an intrinsic source for developing *phronesis,* as well as *episteme* and *techne*. By reflection of knowledge used and needed in action we can distinguish which knowledge really is fruitful and which knowledge is less fertile in order to create higher quality of life and better products. Hereby I would like to add an additional knowledge characteristic: *the reflective knowledge* (cf. Schön 1983). Reflected knowledge (knowledge through which) is the basis for developing *episteme* (knowledge about), *techne* (knowledge for and in), and *phronesis*. Hence I consider *phronesis* an important part of *episteme*, *techne*

and *reflective knowing*. The same is valid for *praxis*, i.e. this action permeates, more or less, all knowing.

## 4.3 Being knowledgeable versus being informed

One remaining issue to clarify is how knowledge can be distinguished from information. First of all I want to emphasise that any clear distinction between knowledge and information is not easily made. It is a tricky issue, especially in our contemporary 'knowledge society' where there is a tendency to obliterate the difference. Nevertheless, I do not regard information as equivalent to knowledge, and therefore we need to be accurate about how we use the words. Second, the following should not be interpreted as any final answers to my previous questions, but as suggestions of how we might handle the distinction(s) between knowledge and information.

Owing to my assertion concerning the problem of identifying the difference, one might ask why then this ambition to try to find it? My answer to that is when we use different words (like knowledge and information) we do that to express some intuitively perceived difference. However, the difference might be hard to tell just comparing how the words are used. Another possibility is that the difference might turn out to lack significance, and in that case we can use two words as synonymously. If we are not sure if there is any meaningful difference, then we need to consider the practical action connected to the notions (Peirce 1931-35[11]). This is an important issue, therefore I will talk about the *nouns* (objects) information and knowledge, as well as the *process* of informing and transferring of knowledge, and the *state* of being knowledgeable and informed.

I will begin by clarifying my opinion that *having information* (being informed) respectively *having knowledge* (being knowledgeable) are conditions related to human beings and thereby subject-dependent. However, is there any difference between being informed and being knowledgeable? Langefors (1993) talks about information as something we get to know. In other words, by obtaining information the receiver will know something more than before, maybe also something new. This approach is in line with the view of information as a central source to knowledge and knowledge creation (see e.g. Dretske 1981; Choo 1998).

There is however an almost opposite interpretation, whose advocates regard knowledge creation as much more than pure information processing (see e.g. Nonaka and Takeuchi 1995; Scarbrough *et al.*1999). In this connection I would like refer to Nonaka and Takeuchi's (1995) description

[11] Look especially in Collected Paper 5 "How to Make Our Ideas Clear".

of similarities and differences between information and knowledge. One similarity is that both are concerned with *meaning*, i.e. both information and knowledge have a specific content. In addition, both notions are *context-specific* and *relational* in the sense that they depend on the situation and are created dynamically in social interaction among people. One difference, that Nonaka and Takeuchi mention, is that knowledge, unlike information, deals with *beliefs* and *commitments*. Hereby knowledge is said to be a function of a particular perspective or intention. Another difference is that knowledge is about *action*.

Using beliefs, commitment, and action could be one way to understand the differences. However, according to Stamper's (1996) ladder (see figure 1 above), where the social understanding includes beliefs, commitments and other attitudes, those criteria are also valid for information, on which I agree. To give one example: When looking at a railway timetable this gives you *information* about when the trains are supposed to depart and arrive. If you then decide to take one of the trains you will buy a ticket believing that the train will depart according to the timetable. Consequently, owing to the information you got from the timetable you make a form of commitment[12] and take an action by buying a ticket. By this example I want to show that information can, just like knowledge, be about beliefs, commitment, and action. Thus, Nonaka and Takeuchi's differences are not very useful and there is a need for further elaboration.

We might connect this to figure 2 above and notice that information in the sense that 'knowing something' (being informed) is very close to *knowledge about* something. Both those conditions are concerned with a kind of meta-cognisance. However, I would say that information is about *pieces* of facts, but when we reach a more *comprehensive* picture of a specific issue or situation then we can hardly talk about "having information". I mean that it is not really meaningful to talk about "being informed" when we mean that we have extensive understanding of something; instead the proper word in this case is "being knowledgeable".

Let me give another example. When looking at news on television or in the newspaper we get e.g. information about crimes of violence at different places on earth. However, according to Tester (1997), we do not *need* to suffer by knowing (having information) about other humans' suffering because, after all, we *cannot know* for sure if they really suffer. Such semiological knowledge (being told about it) can, however, provoke

[12] You commit yourself going on that train by booking a seat, i.e. you have a certain *intention* by buying the ticket (cf. the pragmatic level in Stamper's ladder). Then of course you can neglect the ticket or redeem it if you change your mind and thereby the *actual effect* will be different than the initial *intention* (cf. the social world (level) respectively the pragmatic level in Stamper's ladder).

suffering in someone having great empathy with those having direct knowledge. Still, those who really know (have direct knowledge about) are the persons involved in the violence. This might be an odd example but it can be compared to a more common one. When looking at a list of the stock market we can observe (and get information about) how it goes up and down. We know that, but we do not know for sure why this is happening – that requires a more *comprehensive* knowing, which is more than just have information about some facts.

This leads to the suggestion that in order to distinguish *having knowledge* from *having information* we need to consider the *comprehensiveness of what is known* as one criterion. Getting information can lead to different actions where the information is used as one prerequisite. We can be informed (get pieces of knowledge) about what, how, and why. However, when *acting knowledgeable*, we must often rely on both our intellectual knowing (*episteme*) and practical knowing (*techne*). Moreover, to reach certain ethical and political standards in life (e.g. integrity and well-being) we also need to pay regard to *phronesis,* which concerns knowledge about values, e.g. meaning and purpose with different practices. Accordingly, we can act on information (certain cognisance), but acting knowledgeably often requires a more comprehensive totality including *episteme* as well as *techne* and *phronesis.*

To further explain my view, I will continue with the notions of knowledge for, in, and through action. *Knowledge for* (*techne*) is actionable due to its intention to be used in action; this knowledge has *actability. Knowledge in* is what is used in action (*techne in poiésis*) and requires not only knowledge in the form of know-what (*episteme*) but also know-how (techne) and know-why (*phronesis*). The action itself generates new experiences and insights (*knowledge through*) that are objects for reflection and further knowledge creation (*reflective knowledge*). As with *knowledge about* something, those other forms of knowledge cannot be equated to information.

In summary, we might distinguish *having knowledge* from *having information* by paying regard to the comprehensiveness of: *what are known (know-what), the actability (know-how), the reflective characteristic, and the values-norms (know-why).* Those criteria might not be valid one by one but together they will for sure make the difference.

## 4.4 Meanings and practical functions of information and knowledge

In this part I will illustrate some characteristics of information and knowledge that I have found important in order to clarify the differences and

similarities. Before going in to that I would like to comment on my insight that there is no single distinction between knowledge and information. Instead of searching for *the essence* of different words, we should pay regard to Wittgenstein's (1958) idea about "family similarities" (see also Monk 1991). The words "information" and "knowledge" are both a kind of "family concepts" in the sense that they can have different meanings depending on the context where they are used, and thereby the ontological level they are related to. As Wittgenstein shows, the same notion can be used in different "language-games", and hereby they can be giving different meanings (ibid.).

Figure 3 below shows the prerequisite (input), the process of being informed, and finally the output of the process. The figure should be interpreted as the following: We can get information (originated from someone) through written or oral utterances (signs), and thereby get to know more, or something new. However, information can also be used to verify something already known. In this latter case, the information received will not result in new knowledge, but more reliable knowledge. The prerequisite is signs[13], i.e. a timetable or an oral utterance (cf. $I^b$ and $I^a$ in figure 3). Then we have a process of being informed, which requires pre-understanding together with interpretation. The result is knowledge, within the receiver, which aims to correspond with $I^a$ or $I^b$. In this example we can use the expressions "having information" and "having knowledge" about $I^a/I^b$ as having the same meaning. However, the input in the example is not to be termed knowledge, here we should use the word information.

Then we have another process that begins with a knowledgeable person (see figure 4 below). Having comprehensive knowledge means that the holder has the capacity for high performance within the specific scope of the knowledge. In other words, the person has an ability to do something knowledgeable. When acting the person will utilize her knowledge. By acting and using the knowledge the actor will gain new experiences, which through reflection will add to the total knowledge base of the person. I would say that, in contrast to figure 3 above, in this case it is not meaningful to talk about information; instead we should talk about knowing, or a

[13] Getting informed does not always require signs. There is direct knowledge, as of the person who experiences the suffering unlike the one who is merely told about it. Otherwise signs are always involved. Knowing by reflection entails the processing of signs representing existing knowledge. Observation entails forming signs to represent the observed situation. For example, we can get information about the weather 1) by looking at the thermometer that supplies a numerical sign, or 2) by asking someone who knows about it. Those examples obviously involve the use of signs. However, we can also get to know about the present weather condition by 3) observe the natural state (look out of the window), or 4) by going out and feel the weather. Those latter two examples involve whatever is being observed as a sign of itself.

knowledgeable person. One additional difference, that needs to be emphasised, is that we cannot really talk about knowledge as an object independent of any subjective holder. That is a characteristic that is only valid when we talk about information *as an object.* In other words, the process and the result of the informing process always involve someone, i.e. those meanings of the word "information" are subject-dependent.

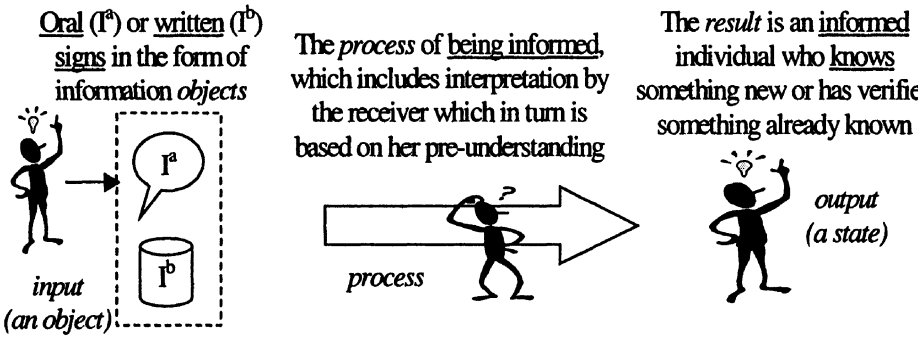


*Figure 3.* The input, the process, and the output of being informed.

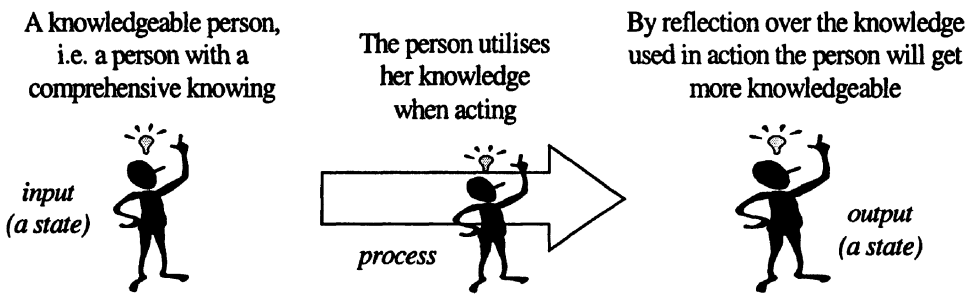


*Figure 4.* The input, process, and output of being knowledgeable.

## 5. CONCLUSION

Even if it is hard to make any distinction between knowledge and information, I believe we need to be more stringent when using those notions. Looking at different views of knowledge versus information, one major basis for my criticism is that definitions often fail to determine their ontological status. As a consequence definitions are often more mystifying, than clarifying.

The primary purpose of this paper is to make some suggestions of how we may distinguish between knowledge and information. To that end, I have examined different meanings of the two words (cf. Wittgenstein's family

conception), together with common practical situations in which we use the words (cf. Peirce 1931-35). I have also emphasised that we need to make clear whether we are talking about the noun (information or knowledge), the process (of being informed or utilising knowledge), or if we refer to the result of a process (to have information or to be knowledgeable).

When it comes to the word "information", we can use this for signs that exist independent of a subjective holder. In this way we can talk about information as an *object.* However, going back to the origin of the word, information derives from the verb describing, informing. In this case it is the *process* that is in focus. Then there is the *result* of the process, i.e. an informed person who knows something new, or something more for sure. In the latter case we can refer to it by saying either: the receiver is informed of something specific, or the receiver has certain knowledge about this something. In other words, this is a situation where it is not meaningful to distinguish between information and knowledge.

However, we also have the opposite case where it is not meaningful to talk about information, or being informed. In this context I have paid special attention to the states: *being knowledgeable* and *being informed.* To distinguish between those two, I have suggested the use of *the comprehensiveness of the knowledge known.* Comprehensive knowing of what, how, and why is prerequisites for, and parts of knowledge (but not for/of information). I have also emphasised that those criteria (i.e. what-, how-, and why-knowledge) might not be valid one by one but together they will make a difference.

In summary, I have described different meanings and functions of the words "information" and "knowledge". I have illustrated similarities and differences between them, together with some practical range of uses.

There is one remaining issue to discuss that concerns written *descriptions of knowledge* versus *descriptions of information.* In reality written descriptions of any kind are just texts (signs). However, depending on the comprehensiveness of the knowledge to be transferred, we can make a difference between those two forms. I would say that there is a meaningful difference between keeping a person posted (inform) about something and to really describe something. I would also say that different IS have different purposes. For example, one IS might have the purpose to record and store information for future statistics, while another IS is used to enhance the immediate ability of the co-workers to perform actions. These are some initial thoughts as well as a proposal for further research.

To end this paper, I would like to emphasise that there is a great need for further discussions on the issues considered in this paper. My hope is that I, with this paper, have contributed to the discussions. Still, the certain issues discussed might represent a never-ending discourse. However, I am very

interested in taking part in this continuing discourse, which I experience, artful, inspiring, as well as frustrating.

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