Information vs. Knowledge:
The Role of intranets in Knowledge Management

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Abstract

Knowledge has widely been acknowledged as one of the most important factors for corporate competitiveness, and we have witnessed an explosion of IS/IT solutions claiming to provide support for knowledge management (KM). A relevant question to ask, though, is how systems and technology intended for information such as the intranet can be able to assist in the managing of knowledge. To understand this, we must examine the relationship between information and knowledge. Building on Polanyi's theories, I argue that all knowledge is tacit, and what can be articulated and made tangible outside the human mind is merely information. However, information and knowledge affect one another. By adopting a multi-perspective of the intranet where information, awareness, and communication are all considered, this interaction can best be supported and the intranet can become a useful and people-inclusive KM environment.

1. From philosophy to IT

Ever since the ancient Greek period, philosophers have discussed what knowledge is. Early thinkers such as Plato and Aristotle where followed by Hobbes and Locke, Kant and Hegel, and into the 20th century by the likes of Wittgenstein, Popper, and Kuhn, to name but a few of the more prominent western philosophers. In recent years, we have witnessed a booming interest in knowledge also from other disciplines; organisation theorists, information system developers, and economists have all been swept away by the knowledge management avalanche. It seems, though, that the interest is particularly strong within the IS/IT community, where new opportunities to develop computer systems are welcomed. A plausible question to ask then is how knowledge relates to information technology (IT). Can IT at all be used to handle knowledge, and if so, what sort of knowledge? What sorts of knowledge are there? What is knowledge?

It seems we have little choice but to return to these eternal questions, but belonging to the IS/IT community, we should not approach knowledge from a philosophical perspective. As observed by Alavi and Leidner, the knowledge-based theory of the firm was never built on a universal truth of what knowledge really is but on a pragmatic interest in being able to manage organisational knowledge [2]. The discussion in this paper shall therefore be aimed at addressing knowledge from an IS/IT perspective, trying to answer two overarching questions: "What does the relationship between information and knowledge look like?" and "What role does an intranet have in this relationship?" The purpose is to critically review the contemporary KM literature in order to clarify the relationships between information and knowledge that commonly and implicitly are assumed within the IS/IT community.

Epistemologically, this paper shall address the difference between tacit and explicit knowledge by accounting for some of the views more commonly found in the KM literature. Some of these views shall also be questioned, and the prevailing assumption that tacit and explicit are two forms of knowledge shall be criticised by returning to Polanyi's original work. My interest in the tacit side of knowledge, i.e. the aspects of knowledge that is omnipresent, taken for granted, and affecting our understanding without us being aware of it, has strongly influenced the content of this paper.

Ontologywise, knowledge may be seen to exist on different levels, i.e. individual, group, organisation and inter-organisational [23]. Here, my primary interest is on the group and organisational levels. However, these two levels are obviously made up of individuals and we are thus bound to examine the personal aspects of knowledge as well, though be it from a macro perspective.

2. Opposite traditions – and a middle way?

When examining the knowledge literature, two separate tracks can be identified: the commodity view and the community view [35]. The commodity view of or the objective approach to knowledge as some absolute and universal truth has since long been the dominating view within science. Rooted in the positivism of the mid-19th century, the commodity view is still especially strong in the natural sciences. Disciples of this tradition understand knowledge as an artefact that can be handled in discrete units and that people may possess. Knowledge is a thing for which we can gain evidence, and knowledge as such is separated from the knower [33]. Metaphors such as drilling, mining, and harvesting are used to describe how knowledge is being managed.

There is also another tradition that can be labelled the community view or the constructivist approach. This tradition can be traced back to Locke and Hume but is in its modern form rooted in the critique of the established quantitative approach to science that emerged primarily amongst social scientists during the 1960's, and resulted in the publication of books by Garfinkel, Bourdieu, Habermas, Berger and Luckmann, and Glaser and Strauss. These authors argued that reality (and hence also knowledge) should be understood as socially constructed. According to this tradition, it is impossible to define knowledge universally; it can only be defined in practice, in the activities of and interactions between individuals.

Thus, some understand knowledge to be universal and context-independent while others conceive it as situated and based on individual experiences. Maybe it is a little bit of both. A concerto pianist has the knowledge – i.e. the ability – to play the piano, something the Metropolitan opera audience is able to appreciate. This pianist, given a suitable instrument, would be able to express his or her knowledge equally well in some other location with a completely new audience. Thus, knowing how to play resides within the pianist and is, in this sense, context-independent. However, should the same pianist be stranded in the middle of the Amazon jungle and picked up by some unknown Indian tribe, her knowledge cannot be manifested. Even if a piano would be available, the Indians would not be able to recognise (and possibly not even appreciate) a classic masterpiece. To make sense, the piano-playing knowledge of the pianist requires the context of a knowledgeable audience. Thus, knowing how to play is meaningless in the wrong tradition or environment. There are thus aspects of knowledge that are held by the individual and others that are more socially constructed. This inter-relationship between individual knowledge and tradition is dealt with by Polanyi when he speaks of *personal knowledge* as something not entirely subjective and yet not fully objective [26]. We shall return to this topic in section six, but first, let us deal with some definitions.

3. Data, information, and knowledge

Not many would question the fact that information can be made tangible and represented as objects outside of the human mind. Knowledge, on the other hand, is a much more elusive entity. Add data, and we have a both intricate and challenging situation of intertwined and

Table 1: Definitions of data, information, and knowledge

Author(s)	Data	Information	Knowledge
Wiig [41]	-	Facts organised to describe a situation or condition	Truths and beliefs, perspectives and concepts, judgements and expectations, methodologies and know.how
Nonaka and Takeuchi [23]	-	A flow of meaningful messages	Commitments and beliefs created from these messages
Spek and Spijkervet [32]	Not yet interpreted symbols	Data with meaning	The ability to asing meaning
Davenport [15]	Simple observations	Data with relevance and purpose	Valuable information from the human mind
Davenport and Prusak [16]	A set of descrete facts	A message meant to change the receiver's perception	Experiences, values, insights, and contextual information
Quigley and Debons [28]	Text that does not answer questions to a particular problem	Text that answers the questions who, when, what, or where	Text that answers the questions why and how
Choo *et al.* [12]	Facts and messages	Data vested with meaning	Justified, true beliefs

interrelated concepts. It has often been pointed out that data, information, and knowledge are not the same, but despite efforts to define them, many researchers use the terms very casually, as is evident from Table 1. In particular, the terms knowledge and information are often used interchangeably. Kogut and Zander, for example, define information as "knowledge which can be transmitted without loss of integrity" [19: 20], thus implying that information is a form of knowledge. This is typical of early texts on knowledge management, which did not sufficiently separate information from knowledge. Nonaka, who is widely quoted in the KM discourse, has too been criticised for such carelessness (cf. [3:133-134]). However, as Nonaka correctly argues, knowledge and information are similar in some aspects, but different in some: while information is more factual, knowledge is about beliefs and commitment.

Not only are the definitions of the three entities vague and imprecise: the relationships between them, although non-trivial, are not sufficiently dealt with. It is unwise trying to define these entities in terms of each other since such definitions seem to further confuse the picture. Figure 1 depicts a view that is commonly found, in variants, in the literature; see e.g. [1, 4, 12, 16]. The problem with the oversimplified figure is that it holds three tacitly understood assumptions, which all can be questioned.
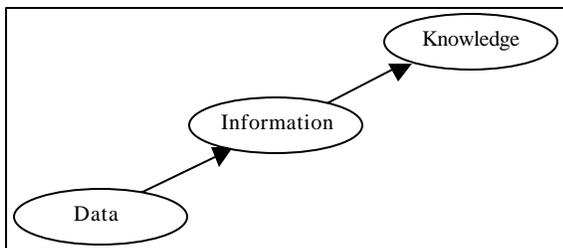

Figure 1. An oversimplified image of the relationship between data, information, and knowledge.

Firstly, the image suggests that the relationship between data, information, and knowledge is linear. The distance between data and information is the same as the distance between information and knowledge, implying that the effort required moving from one entity to another is the same. Though it may not be possible to correctly state the true relationship between these entities, there is nothing that indicates that is should be linear. Secondly, the image implies that the relationship is asymmetrical, suggesting that data may be transformed into information, which may be transformed into knowledge, but it does not seem to be possible to go the other way. This assumption can be noticed also in Table 1, where several commentators define information in terms of data and knowledge in terms of information. Obviously, this is incorrect, since we all on several occasions have used our

knowledge to derive information, and to create data out of information. Thirdly, it connotes the appraisement that knowledge is more valuable than information, which in turn is superior to data. This, too, has been challenged. Tuomi [38] argues that data emerges as a result of adding value to information, which in turn is knowledge that has been structured and verbalised. According to his view, there is no "raw" data, since every measurable or collectable piece of fact has already been affected by the very knowledge process that made it measurable and collectable in the first place. Knowledge, embedded in our minds, is thus a prerequisite. We can instantiate some of this knowledge as information, which is explicit and processable. By examining the structure of this information, we may finally codify it into pure data. Since only data can effectively be processed by computers, data is from an IS/IT perspective the most valuable of the three, and the value hierarchy in Figure 1 should thus be turned upside-down [38].

Although Tuomi makes an interesting and iconoclastic argument, he is not right – he merely errs in the opposite direction. It is not the one way or the other. Instead, data, information, and knowledge are interwoven and interrelated in more complicated ways than any of these two models suggest. The three entities influence each other and the value of any of them depends on the purpose for which it is to be used. Both data and information require knowledge in order to be interpretable, but at the same time, data and information are useful building block for constructing new knowledge [23]. When the information is used, i.e. interpreted in the light of the user's previous knowledge and experiences, or, as Kidd puts it, when new facts inform us, the information does not "become" knowledge but it alters the existing knowledge by increasing or shifting the individual's knowledge state, thereby opening new possibilities to act [11, 18]. As we shall see in section eight, this coupling between knowledge and acting is a reoccurring theme in the KM literature

In my understanding, data and information are only two opposite ends on a continuum. We can concentrate our attention to certain aspects of knowledge, making it focal. The focal knowledge can, sometimes and partially, be articulated and furnished with words. I refer to this as information. If the information becomes too de-contextualised, i.e. too distant from the knowledge required to interpret it, I shall call it data. Since a piece of text itself is not sufficient to exhaustively describe the knowledge to which it refers, the reader's tacit knowledge must be compatible with that of the writer in order to interpret and fully comprehend the implications of the information. Hence, what one conceives as information another sees as data.

4. Adding an IS/IT perspective

When analysing the data/information/knowledge relationship discussed above from an IS/IT perspective, it is obvious that computers are very good at handling and processing data. The transformation of data management into information management also went rather smoothly since computers lend themselves well also to information systems. However, when we now try to cross the border and go into knowledge management things become more complicated. Whereas most people agree that data and information may exist outside humans, supporters of the community view of knowledge would argue that knowledge can never be separated from the knower and thus never stored digitally [17]. Computer support for knowledge management is thus, in a sense, impossible. Those who subscribe to the commodity view of knowledge would claim that knowledge can be explicated and turned into information, which can be handled by computer. Since we already have information systems, computer support for knowledge management would thus not be necessary. However, Alavi and Leidner [2] suggest that although information systems and knowledge systems are not radically different, there is a subtle but important difference in the attitude towards and the purpose of the systems. Whereas an information system processes information without engaging the users, a system for KM must be geared towards helping the users to understand and assign meaning to the information, thereby including the user perspective.

By taking an interest in the user perspective, we acknowledge that though a document may be seen to carry its own information representation, the user wraps this content in an interpretative envelope, thereby giving the information a subjective meaning. It is argued that this combination of content and interpretation is what the user finds valuable [11]. The value of any given piece of information does thus reside in the relationship between the information and the user's knowledge. On its own, the information is useless. Consequently, the same objective information may result in different subjective meanings and values. An IS researcher with a user perspective would thus not only examine the information itself but also the user's cognitive and psychological needs and preferences [11]. This means that design of KM-systems must be based on an understanding not only of information architecture and structure, but also of the situation where the user develops the information need, and analysis of the usage of the same information once it has been obtained and interpreted by the user.

Supporters of the community view of knowledge may thus understand KM "systems" not as an IT artefact but as an environment of people, organisational processes, business strategies, and IT, where the objective is to leverage and advance the knowledge of those people [17]. Advocators of the commodity view may think of KM systems as computer applications used by knowledgeable humans. Hence, regardless of knowledge perspective, IT may successfully be used to facilitate KM as long as the user perspective is included.

5. Different aspects of knowledge

The division of philosophy that investigates the origin and nature of knowledge is called epistemology, and its objective is to establish the foundations upon which human knowledge rests. By examining and justifying different aspects of knowledge and make explicit the relationships and interactions between them, we can develop knowledge systems or schemata capable of answering to questions about the outcome of such interactions [33]. Following a constructivist approach, there will be several such knowledge schemata. Spender speaks in favour of a pluralist epistemology, acknowledging that no single reference system is capable of establishing the "universal truth" [33]. Referring to Rescher, Spender further argues that in a world of bounded rationality and imperfect knowledge, where personal experiences is our principal source of learning, dissensus is a natural state. Attempts to arrive at a view shared by all humans are bound to fail. What we can do is to reflect upon our own beliefs and state these so that others may appreciate from where our different understandings stem. It also seems plausible that different knowledge schemata are applicable in different situations and it is therefore important to ask how a certain perspective is useful in a specific situation. A pluralist epistemology is thus inherently pragmatic and situated [33].

Indeed, a variety of knowledge systems have been presented: Nonaka [21] distinguishes between tacit and explicit knowledge; Boisot [6] advocates a typology consisting of proprietary, public, personal, and commonsense knowledge; Choo [11, 12], building on Boisot, suggest a differentiation between tacit, explicit, and cultural knowledge; Blackler [5], elaborating on Collins [13], speaks of embodied, embedded, embrained, encultured, and encoded knowledge; Spender [33] separates knowledge into explicit, implicit, individual, and collective. However, these views are all based on the assumption that some knowledge is difficult to articulate through language and only exist in form of experiences of which we are not always aware. This form of knowledge was first discussed by Polanyi, who coined the phrase *tacit* knowledge [26]. Another assumption implicitly present in much of the KM literature is that some

knowledge can be expressed verbally, collected in books and manuals, and distributed electronically. This is referred to as *explicit* knowledge. I shall in section seven question the phrase explicit knowledge and claim that all knowledge is tacit and explicit knowledge is in fact information.

Tsoukas [37] acknowledges that the dichotomy between tacit and explicit knowledge and the taxonomies derived from this duality by several authors have advanced our understanding of organisational knowledge by showing its multifaceted nature. However, such typologies also limit our understanding by the inherent formalism that accompanies them. Building on Pepper, Tsoukas observes that "[t]he conceptual categories along which the phenomena are classified must be assumed to be discrete, separate, and stable. The problem is that they hardly ever are" [37: 14]. Latterly, the discourse within the European Knowledge Management field seem to move away from the tacit-explicit distinction, possibly because it is not perceived to add to the debate anymore. The KM community seems to think that the topic has been exhausted and that it is time to move on. However, giving up the distinction between tacit and explicit knowledge is maybe not the best option, especially so since mo st analytic work on KM has been organisational theory informed research and not IT related studies. The point made here is that some things in organisations are tacitly expressed, but therefore not outside the reach of IT support [34]. We should therefore look deeper into the tacit side of knowledge.

6. Knowledge as a tacit background

The notion of tacit knowledge was introduced by Polanyi, a philosopher made known to a larger audience by being quoted in the writings of Kuhn in 1962 [20] and which since has had a renaissance due to the writing of Nonaka [21] and Nonaka and Takeuchi [23]. As Polanyi observed, "we can know more than we can tell" [27: 136]. Unfortunately, Nonaka uses Polanyi's term somewhat differently from what did Polanyi himself. Due to the strong influence of Nonaka's writings on the knowledge management discourse, this misconception has been widely adopted. While Polanyi speaks of tacit knowledge as a backdrop against which all actions are understood, Nonaka uses the term to denote particular knowledge that is difficult to express. There had perhaps been less of confusion had Nonaka used the term implicit knowledge instead of tacit knowledge.

Whilst referring to and building on the arguments of Polanyi, different scholars come to contradictory conclusions. Cook and Brown argue, in what they claim is in agreement with Polanyi, that "explicit and tacit are two distinct forms of knowledge (i.e., neither is a variant of the other) /…/, and that one form cannot be made out of or changed into the other" [14: 384]. In contrast, Tsoukas, also building on Polanyi, claims that tacit and explicit knowledge are mutually constituted and should not be viewed at two separate types of knowledge [37]. In a critique of Nonaka, Tsoukas further argues that tacit knowledge is not explicit knowledge internalised. In fact, tacit knowledge is inseparable from explicit knowledge since "[t]acit knowledge is the necessary component of all knowledge" [37: 14]. Tsoukas believes that the two are so inseparately related that to even try to separate the two is to "miss the point". All articulated knowledge is based on an unarticulated and tacitly accepted background of social practices. We come to know the unarticulated background by being socialised into a practice and thereby internalising an understanding that is not only cognitive but also embodied [37]. It seems that most scholars share the opinion of Tsoukas that it is useful to treat tacit knowledge separate from explicit knowledge only as long as the two are seen as two separate aspects of knowledge and not as different sorts of knowledge.

In Polanyi's understanding of tacit knowledge, it is related both to the society in with we act and to our personal interests and commitments [26]. We have been socialised into a knowledge tradition that forms what Tsoukas calls an "unarticulated background" [37: 14] for our understanding. Our experiences in this environment are interpreted in the light of our tradition. When tradition is merged with personal interests and experiences, Polanyi refers to this tacit understanding as personal knowledge [26]. The cultural inheritance we carry is transferred from generation to generation through a social interplay that both utilises and transcends language. Via socio-semiotic cues and verbal manifestations, we learn not only from the individuals we interact with directly, but also from generations before them. Although experiences cannot be accumulated in a strict sense, our language enables us to be part of a process where individuals and tradition interact. Individuals and tradition shape each other. Without being aware of or able to express the knowledge that is tacitly embedded in our tradition and culture, we use it as an unarticulated background against which we distinguish the particulars to which we currently attend.

Therefore, although the statement "mass equals energy" is not difficult to say, it does not imply that it is easy to understand, since there is no knowledge in the words *per se*. There is a difference between the description and the object being described. When one says, "I cannot describe how to do it", one often means that one cannot describe it sufficiently for someone else to fully understand it or be able to do it, since understanding requires familiarity with both the concepts themselves and the context to which they normally belong. Hence,

knowledge is always tacit. The question, then, is what the phrase "explicit knowledge" is supposed to mean.

7. What is explicit knowledge?

Is there any explicit knowledge? If so, what is the difference between explicit knowledge and information? These seem to be important questions and fundamental to our understanding of knowledge management from an IS/IT perspective. It is therefore surprising to see that they remain unanswered.

Returning to literature, we learn that Nonaka and Takeuchi [23] define explicit knowledge or codified knowledge as knowledge that can be articulated and in formal language including grammatical statements, mathematical expressions, specifications, and manuals. Such explicit knowledge, they conclude, can be transmitted easily and formally across individuals. Choo [11] suggests that explicit knowledge is knowledge that is made manifest through language, symbols, objects, and artefacts. Explicit knowledge can further be object based, i.e., found as patents, software code, databases, technical drawings and blueprints, chemical and mathematical formulas, business plans, and statistical reports, or rule based, i.e., expressed as rules, routines, and procedures. Organisations tend to depend primarily on this sort of explicit and articulated knowledge, written down in memos and illustrated with graphs and used in decision-making processes, or institutionalised as operating procedures, Choo observes.

Blackler [5], elaborating on the categories defined by Collins [13] describes various forms of explicit knowledge. One is referred to as embedded knowledge, i.e. knowledge that resides in systemic routines such as organisational procedures, rules, and regulations. Another form is encoded knowledge, which contains anything that uses signs and symbols to convey meaning.

All the examples of explicit knowledge given above are such that they easily can be disseminated within and across organisational borders. However, Choo admits that it does not follow that the receiving party immediately can comprehend and correctly value the knowledge due to different language, different level of maturity, or lack of required capabilities [12]. How, then, can it be knowledge? My conclusion is that is not knowledge but information. Although we may not be able to fully describe the face of someone with whom we are familiar, and also unable able to give more than a mediocre description of what really happens when we ride a bike from a scientific perspective, the information provided may still be helpful. Words are thus often needed, even if they cannot fully transfer knowledge. The narrative in itself is not enough for the other part to gain a complete understanding, but there are always various means to describe and express feelings and actions. In support of this view, Tsoukas [37] argues that a practitioner's ability to follow rules is grounded on such unarticulated background knowledge, which results in that the rules postulated by an observer differs from the rules actually operating [37:17].

In general, people from the same tradition and culture have more tacit knowledge in common than have people from different traditions. Likewise, groups within the same profession or company have more tacit knowledge in common than have mixed groups. Tuomi, building on the work of Fleck, refers to *communities of thought* to describe the required shared understanding and pragmatic nature of professional knowledge [39]. Only individuals who have a requisite level of shared background can therefore truly exchange knowledge [2]. Tradition, profession, and organisational belonging all carry their own assumptions, and the more overlapping these tacit assumptions and experiences – i.e. the personal knowledge – are, the better from a knowledge sharing perspective. If all three realms overlap, the likelihood that two persons (e.g., two North American software developers working for Microsoft) will be able to understand each other increases, and the discrepancy between the information provider's intended meaning and the recipient's interpretation will be small.

In contrast, a Scandinavian microwave expert working for Ericsson might not understand the text, since she, being from another culture, having a different profession, and working for another company, would not have the required common knowledge base [2]. In her case, additional information would have to be provided or she would have to spend time with software developers and Microsoft employees to acquire the relevant knowledge through socialisation [21].

Information therefore requires knowledge both to be created and to be understood. Although information and knowledge are related, the information *per se* contains no knowledge. Alavi and Leidner posit that "information is converted to knowledge once it is processed in the mind of individuals and knowledge becomes information once it is articulated" [2: 109]. The fact that routines, procedures, rules, manuals, books, blueprints, and all the other examples given above are useful does not make it knowledge. They all need knowledge to be decoded and are therefore not knowledge but information, albeit interwoven with the knowledge required to create it. Knowledge, which remains tacit, is also needed to interpret the information. Although some argue that "knowledge" may be embedded in a text (e.g., a balance sheet where columns and totals have predefined meanings), the reader cannot appreciate it without bringing the required personal knowledge. Figure 2 illustrates the separation between knowledge and

information, between the tacit and the articulated. Knowledge is understood as the tacit part of our traditions and experiences while information is the small part we are able to articulate.
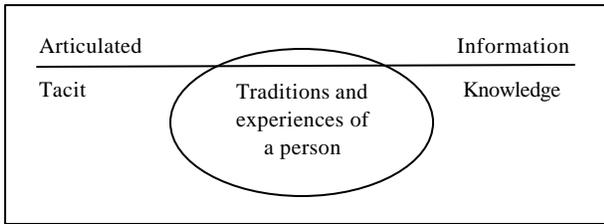

Figure 2. Our tacit knowledge can be articulated into information if made focal.

8. Knowledge in action

When Schön elaborates on the relationship between the tacitly implied and the reflected, he admits that we often cannot say what we know [31]. When we try, we end up with descriptions that are obviously inappropriate, and there must always be such a gap between the description and the reality to which it refers. A practitioner's tacit knowledge is always richer in information than any description of it, and her knowledge is implicitly found in the patterns of his actions. According to Schön, our knowledge is in our actions [31: 49].

Although actions in themselves are rather ephemeral in character, they often leave a tangible result, such as when building a house, making a sculpture, or implementing a software system. There are also actions that do not result in new artefacts but yet change the state of things, such as driving a car from A to B, and actions that are totally ephemeral, such as the playing of an instrument. Regardless of which, actions are the only way through which knowledge can manifest itself. This does not mean, however, that knowledge *must* result in action in order to exist. The ability to take action is sufficient, but as long as the knowledge remains inactive, it is of no organisational value [12].

One action often seen in offices is the creation of information artefacts such as text, for example in the form of documents, email, or web pages. In a corporate setting, not only information creation but also information seeking and information interpretation are actions that describe the interaction between knowledge and information. By monitoring these actions, the organisation can learn where certain kinds of knowledge reside and thereby leveraging the tacit knowledge of its members. Individuals benefit both by being able to find knowledgeable colleagues and by being themselves identified as knowledgeable [34].

As discussed above, texts are not understood equally by all. Baumard comments that when the search for knowledge takes place in the territorial waters of the organisation it becomes far more contextual than a search for some absolute or universal truth. In organisations, knowledge is generated by those beliefs to which the members are most committed [3: 53]. Commitment and beliefs vary from organisation to organisation, and even within the same tradition, organisations have their own culture, their own vocabulary, and their own (tacit) assumptions. As we have seen, this means that organisational members in general can share knowledge more easily among themselves than with people outside the organisation. However, in large organisations where it is impossible to know every fellow employee, people tend to gravitate towards those who are similar in a professional sense.

Such groupings may occur on two levels. One level is the loosely coupled network of employees sharing a practice but yet being unknown to each other. These *networks of practice* may reach far but have little reciprocity, since the members do not interact to any significant degree [9]. Within these networks of practice, there is also a second level of tighter clusters, referred to as *communities of practice* [8, 24, 25, 40]. In these latter subgroups, people typically know each other and work together, at least occasionally. When reciprocity dominates reach, as it does in communities of practice, an environment with enough coherence to allow perspective making emerges [7, 9], and by sharing war stories, i.e. narratives that to an outsider might seem commonplace and banal, these members exchange knowledge tacitly understood only within the community. Members sometimes bond more strongly to their community than to their company, which makes it possible for communities to transcend the boundaries of the organisation as in the case of the open source movement.

Schön [31] claims that new understanding comes from reflection. Reflection can occur in action, but this requires the practitioner to mentally "step back" while observing one's own actions. Such reflection, however, can only take place when the practitioner is not fully preoccupied by the action itself. Reflection in action thus requires a certain level of experience that enables the practitioner to shift attention from doing the action to how the action is done. Reflection can benefit greatly from being done in dialogue, either with colleagues within a community of practice or with one self, but dialogue means articulating and making tacit understanding explicit. Reflection in dialogue with others thus requires an arena that allows a multitude of formats and interactions. This is best achieved in face-to-face situation but when physical meetings are impossible or impractical, virtual meetings on an intranet may provide a viable substitute.

9. Intranets in KM work

Though an intranet can be conceived as many things, the prevailing image is that of an information silo or a repository of unstructured information. This illustrates the often-used information-centric perspective of intranets. As argued above, for KM systems to be successful they must include users and provide mechanisms for these users to locate and interact with each other. One important objective for an intranet would be to provide a context where dialogue, reflection, and perspective making could occur. Nonaka and Konno [22] use the Japanese word *ba* to describe a shared space of physical, virtual, and/or mental nature, which could be seen as an example of such an environment. However, Nonaka and Konno primarily see IS/IT as a facilitator of the *Cyber ba*, i.e. an environment for supporting the combinational phase of knowledge creation where old explicit knowledge is mixed and merged to form new explicit knowledge [21, 23]. Though such support would facilitate the access to and the interaction with information, the remaining knowledge creation phases that deal also with tacit knowledge, i.e., humans, are not covered.

One suggestion is to view the intranet as a shared information space for content, communication, and collaboration [12]. The merit of such a model is that it acknowledges that the information-centric view of the intranet is not sufficient. However, the distinction between communication and collaboration has been criticised by the CSCW community, where it has been convincingly argued that though there is a clear pragmatic difference between the two, the distinction is useless from an theoretical/analytical perspective [10, 29, 30]. Based on this critique, I instead suggest a model where the intranet as a KM environment is seen from three different perspectives; the information perspective, the awareness perspective, and the communication perspective. This is illustrated in figure 3.
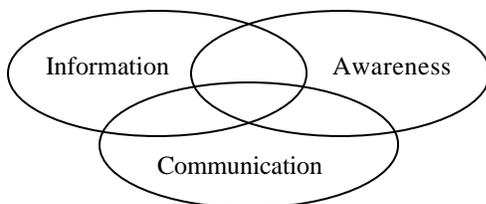

Figure 3. A multi-perspective view of the intranet

The *information perspective* is the most obvious view of the intranet, since information provision is a fundamental part of the infrastructure. Seen from this perspective the intranet gives the organisational members access to both structured and unstructured information in form of databases and documents. Access to rich and diverse sets of information is important for organisational knowledge creation since it provides rich stimuli and requisite variety [23]. The intranet thus affects the interaction between information and knowledge in today's organisations by increasing the consumers access to information and the opportunities for producers to reach a larger audience. To merely read the text is not enough, though. The reader must also reflect upon her assumptions, her actions, her experiences, and what consequences changing the rules will have on her future actions. Reflection therefore enables us to learn how to learn. Information plays an important role as a catalyst for reflection and an information perspective on the intranet is thus highly relevant for work that requires knowledge. On top of the infrastructure, applications must be built to complement the information perspective by providing awareness and facilitating communication.

The *awareness perspective* suggests that not only explicit information links but also tacitly expressed connections should be exploited to hook up organisational members with information and people they might otherwise have missed. The large amount of information available can result in information overload, and to avoid such a situation and maintain the awareness perspective, tools to assist the organisational member by prompting when new and relevant information is added must be developed. By making users aware of peers who not only share an official job description but also have accessed the same information or authored similar documents, the networks of practice discussed earlier can be established. Such a network is a prerequisite for community building, and increases the likelihood for successful communication and collaboration.

The *communication perspective*, finally, enables the organisational members to collectively interpret the available information by supporting various forms of channels for conversations and negotiations. The intranet communication perspective promotes reflection by making salient different interpretations and viewpoints. By offering workflows and co-ordinating routines as well as support for more informal collaboration such as shared whiteboards and project areas, the intranet provides means for organisational members to work together. When engaged in collaborative work with peers that share your objectives and understand your vocabulary, the common context necessary for knowledge sharing exists. From a communication perspective, we can act upon our new understanding, thereby transforming our knowledge to organisational benefit. A major objective for the intranet must therefore be to enable people to actively work together based on the information available to them, and facilitate the documentation of their experiences. The intranet would thereby leverage the knowledge of the organisational members. The communication perspective

must not be isolated from the information and the awareness perspectives. Only as a holistic whole are the potentials for successful knowledge management fully utilised.

10. Conclusions

When trying to manage organisational knowledge various types of IT-based systems have been devised, seemingly without much concern for the nature of knowledge or how knowledge is different from information. In this argumentative paper, I have examined a broad range of relevant literature and pointed to the differences in perspective that exist. I have looked into the relationship between information and knowledge and presented examples from the literature and from my own understanding. Furthermore, I have tried to position IT in relation to this discussion and in particular argued for a multi-perspective view of the intranet.

Based on Polanyi, I claim that knowledge is based on personal experiences and cultural inheritance and fundamentally tacit. We use our knowledge to perform actions such as creating information. Although the knowledge required to create the information is interwoven with the information, the reader must still have knowledge similar to that of the creator to be able to interpret the information. The more overlapping the cultural background is between the two, the easier the information is understood. Information is thus a vehicle for reflection that may, by informing the reader, expand or relocate his or her knowledge state. Information and knowledge are different but they affect one another.

When facilitating KM initiatives, information technology environments such as intranets may be utilised to establish a virtual meeting place where communities of practice can engage in dialogue and collaboration. Actions such as information creation, information seeking, and information interpretation can successfully be performed in these environments. To facilitate this, intranets must be design to support not only the informational aspects but also include people by making salient networks of users with similar interests and allow these to communicate and collaborate. I therefore argue the intranet must be viewed from both an information perspective, an awareness perspective, and a communication perspective.

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12. References

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