User-Centred Knowledge Management: A Constructivist and Socialized View

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> Context • The discipline of knowledge management (KM) begins to understand a) *that* it should move towards a user-centred, socialized KM and b) *which* business objectives provide motivation to do so. However, it lacks ideas on *how* to reach the objective that it suggests and justifies. We contend in this paper that this change requires a more viable understanding of knowledge combined with a suitable model of social interaction, otherwise it will fail. **> Problem** • The problem to be solved is to find a way to blend a model of social interaction and a suitable understanding of knowledge so that together they can contribute to the objective of implementing a "user-centred KM." In this paper we show a solution articulated in several conceptual and experimental components and phases. **> Method** • We use a systemic and cybernetic approach: systemic analysis of the problem, conception of a cybernetic approach, design of a systemic solution, and its evaluation in an experiment. The main methods used are systems engineering, cybernetic modelling, and knowledge engineering. **> Results** • We propose seven interrelated results: 1. A defect analysis of KM; 2. The concept of knowledge as the "Logic of Experience"; 3. A set of five KM design principles; 4. The principle of "Knowledge Identity"; 5. The model of "Knowledge Cooperation"; 6. The architecture of a user-centred KM system; and 7. Insights from a KM experiment. **> Implications** • Our results are useful for any stakeholder in today's knowledge economy when they need to understand, design, build, nurture and support an organization's capacity to learn and innovate for the benefit not only of the company's financial owners but also of the individuals who work in it. Future research should urgently address the issues of "knowledge identity" and the "knowledge contract" and KM practice should design its next steps for moving towards a user-centred KM in conformity with the principle of "knowledge identity." The paper links explicitly to radical constructivism and argues in favour of a radical constructivist foundation for KM in which knowledge is seen as the "Logic of Experience." It also shows how this KM foundation can be extended with a social perspective and by that allow the individual and the social to be conceived of as complementary elements in one single KM system.
> Key words • **Logic of experience, knowledge identity, knowledge cooperation, design for meaning, community of research, user-centred knowledge management.**

I say that love is the emotion that constitutes social phenomena (Maturana 1988a: 64)

Introduction

A recent Gartner research report (Rozwell 2009) proposes that the discipline of "Knowledge Management" (KM) has a new emphasis called "socialized knowledge management." The author, Carol Rozwell, claims that many traditional KM initiatives and projects undertaken in the last 20 years failed because they "missed the point that knowledge resides with people and … is difficult to access and use without collaboration" (Rozwell 2009: 2). As a solution, the report suggests a new socialized model of KM: "a model that puts users at the centre of the process;" a model in which knowledge is viewed as "embedded in the networks and relationships of people."

This Gartner model of socialized KM consists of a list of requirements that a KM initiative or project should realize in order to produce a KM solution in which networked users are at the centre of the KM process; unfortunately it does not say anything about the design and implementation of such a KM system. In summary, the Gartner model clarifies the challenge or expected outcome ("what") and gives business related reasons for pursuing it (objective, "why") but leaves open the crucial question of the means of producing that outcome (design principles, approaches, guidelines, elements, architecture, functions, roles, processes, interactions). So *how*, by which *means,* can we reach the *end* of obtaining a KM system (in our terminology always a unity of methods and tools) that has the user at its centre, a *user-centred KM system*?

This paper aims at providing an answer to this question by drawing on KM research performed by the first author during the last 25 years that combines: 1) lessons learned from applying radical constructivism (RC) to artificial intelligence (AI) and 2) a social theory of learning.

The AI lessons – which basically provide the *individual* component of our approach – were the result of experiences with the design and implementation of AI systems by the first author between the late 1980s and the early 2000s; they revealed that an essential success factor had been a foundation in operational methodology, Kantian criticism and radical constructivism (Sowa 1983; Bettoni 1985, 1997, 2000). The social theory of

learning – which provides the complementary *social* component – is that developed by Etienne Wenger and applied in the domain of KM mainly through its concepts of "legitimate peripheral participation" and "community of practice."

To reach the goal of our paper, we invite the reader to follow us in a journey leading past seven milestones:

1 | The first milestone is a defect analysis of KM, triggered by reflection on the relation between knowledge and KM.
2 | The need to improve those defects leads to the second milestone: our concept of knowledge as the "Logic of Experience," a radical constructivist understanding of knowledge, conceived for advancing the person in the direction of his or her tendencies in the context of KM initiatives.
3 | This enables us to proceed towards the third milestone: a set of five practical KM design principles that complies with knowledge as the logic of experience and suggests a balance between the individual and the social element.
4 | We start this work of balancing the two elements with the principle of "Knowledge Identity," the fourth milestone, derived from the five design principles and conceived of as a guideline for finding a suitable model of social interaction.
5 | We then continue towards the fifth milestone, which consists of our model of "Knowledge Cooperation," a KM approach that complies with both a suitable model of social interaction (Community of Practice) and our understanding of knowledge as the logic of experience.
6 | The need to explain in project meetings our view of a user-centred solution to a real KM problem leads us to our sixth milestone, a user-centred KM system architecture that clarifies – by means of a systemic assembly view – how the previously mentioned concepts and approaches can be assembled in a KM solution.
7 | Finally we attain the end of our journey, our seventh milestone: an experiment in which we have practiced and tested empirically what we preach by implementing and refining our approach in a KM solution called "CoRe," a network of university researchers.

Defect analysis of knowledge management

Many of the KM initiatives undertaken in the past 15-20 years did not turn out as planned (Gartner 2009: 2) or, in other words, they failed. But the worst part is that traditional knowledge managers and researchers with a mainstream, traditional KM perspective were not able to understand why these failures happened (and why the knowledge economy is in a dire state). In fact, very often their analysis produced the "insight" that "people – using the KM system – are the problem." From our background in RC, we are convinced that the users of the system are in no way the main part of the problem. We have made a different analysis of the failures of KM and have identified a different problem: the transfer to KM initiatives of approaches used for managing work, such as "the dogma of scientific management" (Snowden 2002), the failure to consider that KM is essentially about people (Hildreth & Kimble 2002) and the failure to find ways to put people at the centre of KM solutions (Nonaka & Takeuchi, 1995).

For people involved in KM, one question arises naturally, spontaneously and tacitly: "What do we mean by knowledge?" (What is knowledge?). Also, the answer comes in most cases naturally and spontaneously but is tacit and – unfortunately – is quite never made explicit. KM practitioners instead tend to delegate to university professors of philosophy or related disciplines the job of making explicit a shared understanding of the concept of knowledge and are happy enough with their intuitive, unaware understanding of the concept of knowledge. As a consequence, the practice and discipline of KM displays a striking discrepancy between the great importance attributed to knowledge (the knowledge economy, knowledge resources, knowledge societies, knowledge-intensive firms, etc.) on the one hand and the vague and blurring conceptualizations of knowledge used in the KM discourse on the other hand (Schreyögg & Geiger 2007). Another consequence is what Ursula Schneider has called "the original sin of KM": to behave in KM practice as if one knows what knowledge is (Schneider 2001: 47–51).

In our view of KM, becoming aware of the way we look at knowledge is essential for the following main reasons, which relate to the special relation between knowledge and KM:

- the above-mentioned discrepancy suggests that a more viable concept of knowledge could have a huge impact on improving KM;
- the above-mentioned "original sin" of KM causes investments in the wrong direction and promotes an attitude towards KM that reinforces the problems that KM practicioners need to solve;
- in KM the focus is on processes (Probst, Raub & Romhardt 1997) of handling knowledge, i.e., dealing with knowledge as *an asset* (Mentzas et al. 2003), which exhibits a kind of *process-object duality* similar to the wave-particle duality in physics;
- our understanding of knowledge is *the framework* that gives support and orientation to our KM approaches and enables KM activities (Reinmann 2001: 13);
- our understanding of knowledge is the foundation on which KM initiatives are built: we can no longer behave like the foolish in the Bible and build KM upon sand (Matthew 7: 26);
- finally and most importantly: knowledge and knowing are *constitutive of the essence* of a human being; to know and to understand is a fundamental human need (Maslow 1987: 23) and "by nature all men desire to know" (Aristotle 1957: 1): in other words, you need a human being for knowing.

Lessons from knowledge engineering

How can we become aware of the way we look at knowledge? In our case it was Knowledge Engineering (an Artificial Intelligence technique) that provided us with some useful, practical opportunities for reflecting about knowledge (Bettoni & Fuhrer 2001) and enabled us to learn some lessons relevant to KM. Knowledge Engineering (KE) is basically the art of making explicit the tacit knowledge of experts (employees, associates) by means of models that are suitable for automation. Examples of knowledge automation are the automatic assessment of

Figure 1: Defect analysis of knowledge management.

tax returns, automatic diagnosis of machine faults, automatic programming, etc. The first author has nearly 20 years of professional experience (1986–2005) in making explicit the tacit knowledge of experts and the main lesson that he has learned from those experiences is that successful KE is possible (contrary to the negative image of expert systems) but requires an *understanding of knowledge* that promotes the relevant human factors involved in modelling knowledge (Bettoni & Schneider 2002).

What we claim now is that it is possible to transfer the same lessons and suggestions from the field of KE to the field of KM. The main lesson that we transferred is that to successfully implement KM you need to start from and provide as a framework an understanding of knowledge that promotes those human factors (HF) that are relevant to the special relation existing between knowledge and KM (see above), i.e., basic human elements and tendencies such as identity, meaning, desire to know, free will, social responsibility, mutual acceptance, love, intentions, interests, wishes, hopes, expectations, etc. This is the first and most important feature needed.

Based on this foundation, in our analysis we begin by trying to understand what influences or what determines some major defects (obstacles, problems) of KM (Figure 1, right box) such as lack of engagement, missing motivation for sharing, difficulties in the transformation of tacit knowledge into explicit knowledge, lack of transparency in knowledge stores and "information architectures" (taxonomies, ontologies), insufficient integration of KM tasks within business processes, etc. With the above-mentioned lesson from KE in mind, the results you get from an analysis of these defects of KM will be very different than those obtained from conventional approaches.

We suggest that a main cause of failings is that the relevant HF are not appreciated and promoted enough (Figure 1, middle box) and we see a reason for this in our established way of looking at knowledge in which we are convinced (have the illusion) that our knowledge corresponds to reality, is the logic of reality and that we can access and extract this logic from there (Figure 1, left box). When we work at the meta-level of knowledge (= anything we do in KM/knowing "about" knowledge, instead of knowing about any other topic or object), then this view (this "measure") becomes a big handicap. Why? Because of the influence of this measure on the human factors!

Regarding the influence of the traditional conception of knowledge on the HF (Figure 1, lower arrow between left and middle rectangle), we have learned from cybernetics and "new biology" – precisely, from Heinz von Foerster (1984, 1995), Humberto Maturana (1988a, 1988b, 1992) and Walter Freeman (2000) – that understanding knowledge as a mapping (as the "logic of reality") *negates* the human factors: by "negates" we mean here "obstructs the progress of the person in the direction of her basic human tendencies," a conception that we see supported by the humanistic school of psychology (Maslow 1987; Bühler & Allen 1972).

Why? Because when I understand my knowledge as the logic of reality, I then follow a path of objectivity in which I implicitly deny the power to choose (determinism instead of free choice), I implicitly formulate a demand for obedience (awarely or unawarely) and I implicitly put forward my knowledge as an argument, which the other will not be able to deny. Knowledge of this kind becomes an argument to force the other, to compel the other, to do as I say! On such a basis of Determinism and Obedience I cannot really respect the person in front of me (employee, associate or partner)! So Determinism and Obedience are two great obstacles to knowledge sharing, to successful Communities of Practice, to the improvement of knowledge processes (in which the person is involved) in general. In a "work economy" this has a weaker influence on economic performance but in a "knowledge economy" like ours, its influence can be very strong.

Our understanding of knowledge as the logic of reality appears clearly in the dominant language of mainstream KM, where knowledge is treated as a thing. For KM to succeed, we will need to lay aside this and other dangerously out-of-date management beliefs, such as, for example (Wheatley 2004: 146–147): organizations are machines; only material things are real; only numbers are real; you can only manage what you can measure; technology is always the best solution.

Knowledge as the logic of experience

What are the alternatives? What should our understanding of knowledge be in order to avoid the defects mentioned and to advance the person in the direction of his or her tendencies in the context of KM initiatives? How can we rethink what we know about knowledge in a way that allows us to do our most important work: paying serious attention to the *human dimension* (Wheatley 2004: 148)? Our answer is a conception of knowledge as the "logic of experience,"

which is not a new conception but simply an attempt to put the radical constructivist conception of knowledge into terms that are better adapted to business and management discourse.

"Knowing begins with the awareness of the deceptiveness of our common sense perceptions" (Fromm 2008: 33). But what follows then as next step on this path? When this awareness consists of the conviction that "most people are half-awake, half-dreaming, and are unaware that most of what they hold to be true and self-evident is illusion" then this path of knowing continues with "the shattering of illusions, with disillusionment (Ent-täuschung)" as the next step or measure against the deception of perception.

We suggest that there is another way of awareness, an alternative path, in which we become aware of the active, constructive role that we – as individuals and as society – have first in producing those "common sense perceptions" and then in evaluating them as "deceptive," as "illusions," as "true" or as "self-evident."

The alternative that we propose is articulated in five aspects of knowledge, five characteristics essential to the goals of overcoming determinism and obedience and instead awarely and explicitly promoting human factors.

The value and function of knowledge

In business we are interested in the value of knowledge. And what determines the value of knowledge for a knowledge owner? It is its function (the first essential aspect). And what is then the function of knowledge? The Swiss psychologist Jean Piaget suggested that the function of knowledge is adaptation (Glasersfeld 1995), that knowledge is what makes adaptation possible. Adaptation to what? To situations: the knowledge owner adapts to what he or she perceives, lives, as a certain situation. And situations are experiences of events! If a meteorite comes down now and hits me, my colleague at the next desk can experience it as a perturbation in space or as a divine punishment, as in the Middle-Ages, or in many other ways. How does this adaptation work? What drives and controls it? What is the core mechanism?

The motor and mechanism of knowledge

Following radical constructivism, we suggest that the core mechanism of adaptation is the construction of viable experiences (consistent, coherent, valid). The construction of viable experiences is driven and controlled by factors such as intentions, interests, wishes, hopes, expectations, etc., which are very specific to each knowledge owner. These human factors are highly individual and make the knowledge (logic) of every single person also highly individual: so it cannot be the logic of reality, it can much better be seen as the logic of experience. Adaptation and construction create the experiential worlds in which every single person lives. What does "construction" mean here? We are not saying that the mind creates reality in a physical sense! We use "construction" in a similar sense to its use in engineering, where it is used for activities such as planning, design, building and testing. In the case of cognition, we say that the brain "constructs" its knowledge in the sense that it can know only what it has *determined* (i.e., only what it has done by planning, designing, building and testing its acts). The first to formulate this in such a way was the Italian philosopher Giambattista Vico in about 1710 (Glasersfeld 1995). Notice that our constructions are not arbitrary! So, do not worry. Why? For three main reasons: because we do not create reality *physically*, our constructions are merely *operational* experiences in different operational domains (artistic experiences, engineering experiences, manufacturing experiences, financial experiences, etc.); because we rely on them as tools for achieving something; and because we test them against the results of what we have achieved. Recent developments in brain sciences show an increasing tendency to determinism: the denial of the possibility of choice. This is the (logical) consequence (and demonstration) of the underlying assumption that knowledge is the logic of reality. But we are not like stones rolling downhill (Spinoza): the power to choose is a constitutive and unalienable property of human life (Freeman 2000). The blessing of freedom and the burden of responsibility: the fundamental human factor!

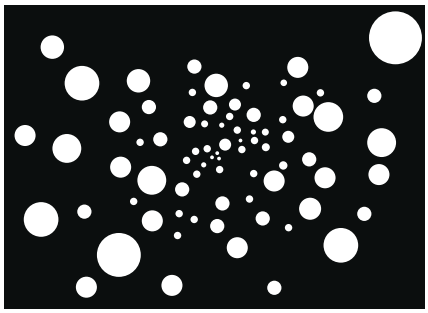


Figure 2: The firmament.

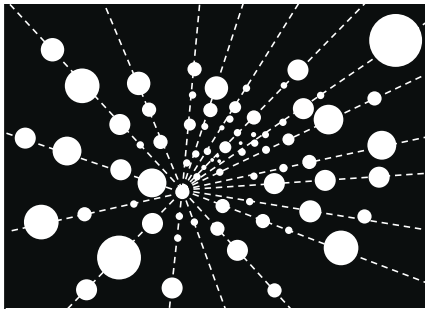


Figure 3: Linear order seen in the firmament.

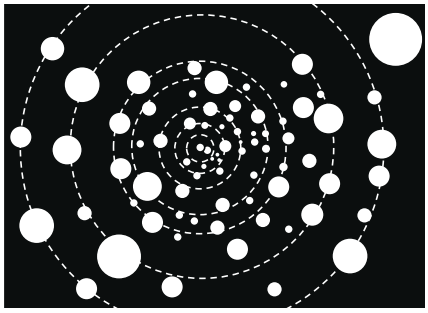


Figure 4: Circular order seen in the firmament.

Example: Multiple perceptions

How should we then understand knowledge (notice that we prefer this expression instead of saying "what *is* knowledge") if it is not appropriate to understand it as the "logic of reality"? Look at Figure 2 (Ceccato 1980; after Parini 1996: 24): is this "chaos" or the "cosmos"?

It depends on how we look at it. We can of course look at it as "chaos" but also as *linear* order, or as *circular* order (Figures 3 and 4) or in many other different ordered ways (spiral order, combined spiral and linear order, etc.) and these multiple perceptions (knowledge) are always the logic

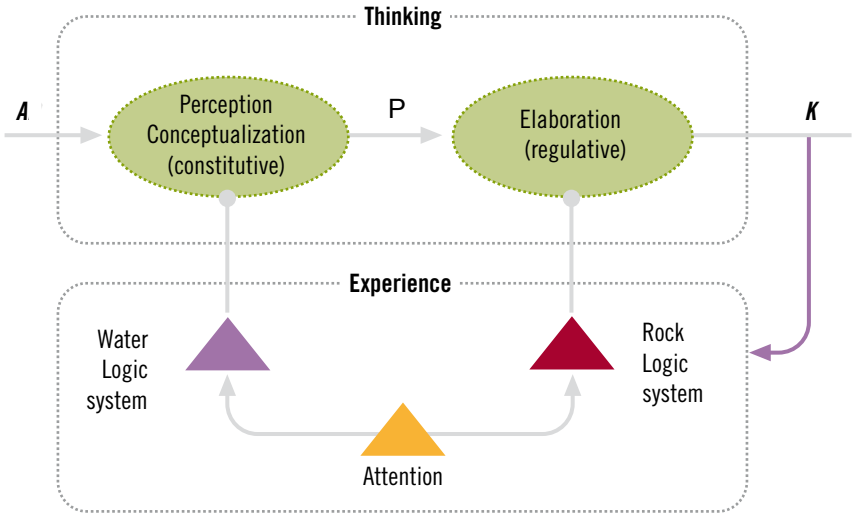


Figure 5: The logic of experience: An autopoietic process model.

of your experience, not the logic of reality. This suggests to you that it is more appropriate to understand knowledge as the logic of experience!

States and transformations

Knowledge can be distinguished in many ways, aspects or dimensions, such as meaning, motivation, codification, process, ownership, source, value, etc. One dimension that is of great relevance to KM is the physical state of knowledge (a = in our head, b = in an artefact) with or without awareness. This aspect takes two main forms: tacit and explicit. Tacit knowledge, the "treasure in our heads" (consisting mainly of experiential knowledge) is knowledge that we "cannot tell" about (Polanyi 1983: 8) because we are not aware of it; it adapts itself dynamically to all situations, belongs to its constructor and goes home with her every evening when she leaves her work. Tacit knowledge is generated in any individual either from available tacit knowledge ("reflecting") or from explicit knowledge ("interpreting") and perception ("reification" Bettoni 2008: 68) and constitutes "a kind of living structure that grows and changes, yet endures" (Freeman 2000: 9). Explicit knowledge is knowledge we have become aware of, for example by embodying our living, dynamic tacit knowledge in material carriers (artefacts). Such artefacts are, for instance, manuals, laws, reports (documents of any kind, including diagrams and drawings), procedures, organizational methods and structures, and equipment. Explicit knowledge is, so to speak, "frozen" tacit knowledge, its shadow, and we could well call the conversion from the tacit to the explicit state either "mapping," "representing" or "embodying." Together the three transformations (interpreting, reflecting and representing) constitute the process of thinking. A crucial point is now the logic of this process. Why? Because it determines the networking of knowledge operands (the natural organisation of knowledge) that constitutes the framework of experience.

The Logic of Experience: An autopoietic process model

How do we make these knowledge operands that constitute the previously mentioned operational experiences? First of all, in line with Piaget (1967) we suggest seeing a formative, organic principle at work in the generation of knowledge, too; secondly, as proposed by Freeman (2000: 9), we try to conceive of knowledge operands as "a kind of living structure" with constructive procedures or operational sequences organized according to an underlying organic principle. Finally, since the essence of a living system (organism) is *autopoiesis*, or in other words "self generation," we suggest understanding knowing as an *autopoietic* process with its peculiar form of circular organization. Maturana, who developed the concept of *autopoiesis*, says: "The product of the functioning of the components is the same functioning organisation that produced them." (Maturana 1980: 9). In the domain of knowing, this requires that the interactions of the elements (= knowing) "bring forth elements of the same kind; that is crucial" (Maturana & Poerksen 2004: 107). Accordingly, we conceive of knowledge as a result of cognitive processes in the dynamic form of a functional organization that extends or modifies the functional organization that produced it. In this conception, knowledge displays a "product/function duality" similar to the wave/particle duality in physics; as a product, the results of knowing can be used as building bricks of a knowledge edifice (a theory, an inquiry, a claim, a judgement, etc.); as a function, they become part of the same "knowing system" that produced them.

In Figure 5 the autopoietic process of knowing is represented as circular organization with two blocks (thinking and experience) connected by a feedback loop. Thinking has been distinguished into two sub-processes – perception and elaboration – with A (alteration) as input, P as an intermediate result and K (knowledge) as the final product. For example, if we consider the knowing needed to knot a necktie in the morning, then A comes from the necktie, Perception and Conceptualization are relevant when learning to knot the tie and Elaboration is relevant when the knot is made without looking at, automatically.

The second block, Experience, where the final result K is fed back from Thinking, has been distinguished into three sub-systems: a system of attention (Ceccato 1964, Ceccato 1964/1966; Bettoni 2007), which on one side controls the constitutive part of Thinking (perception and conceptualization) through a Water Logic System, and on the other side also controls the regulative part of Thinking (elaboration) through a Rock Logic System. These three systems are the place where the knowledge, K, produced in thinking and fed back *behaves as function* and becomes part of the same "knowing system" that controlled its production.

Surprisingly, perception is far more important for knowledge than elaboration. But traditional thinking – according to Edward de Bono – is focused exclusively on elaboration and dislikes the vagueness, subjectivity and variability of perception. In our tradition, elaboration consists basically of the use of argument and reason with the goal of "falsification": i.e., demonstrating the contradictions of a position or showing that something is false. Reality is proposed as the Universal Absolute that has to be used as the reference. "I am right – you are wrong" (de Bono 1992) condenses the essence of the "logic of elaboration" (rock logic, because, like a rock, it is permanent, hard, and has a definite shape). Luckily perception has a different logic, the logic of pattern-building systems, but we ignore it. Why? Because we have never understood perception! Just as water fits in a bowl or bottle, the patterns that perception constructs are not right or wrong; they simply "fit" in the situations and circumstances that the person lives and experiences (water logic). Conceptualization (categorization) also works within the same "water logic": this is the main reason why perception is more important for knowledge than elaboration. For example, this page can be conceived as a "part" (of the journal) or as a "whole" (in relation to the lines, words, etc. of this page), depending on what fits what the person lives, not depending on "Reality." We, with our conceptual operations, can flexibly adapt our perception and conceptualization to "fit in the bowl." This "operational" perspective is the pioneering contribution of Silvio Ceccato and his Italian Operational School (Glasersfeld 1995; Sowa 1983; Bettoni 2007).

Logic of experience – summary

What we have found is a concept of knowledge as the "Logic of Experience," which can be summarized in the following way:

- Main function: adaptation to situations as they are lived
- Core mechanism: construction of viable experiences
- Interpretation: a construction process where our way of looking at something (our operations) determines *what* we see more than the something we are looking at
- Representation: the process of embodying tacit knowledge (what we see) in something that we can look at, hence the inversion of interpretation
- Perception: the pattern-building processes of perception supported by conceptualization (constitutive operations) are more important than elaboration (regulative operations).

KM design principles

We started our search for an alternative view of knowledge with two main conditions in mind: the need to improve the defects of conventional KM and the aim of advancing the person in the direction of his or her tendencies in the context of KM initiatives. How can we use this new foundation to create successful KM initiatives? How can we guide and facilitate their implementation? As an answer to these questions, we have derived from our view of knowledge as the logic of experience a set of five principles to be used as practical criteria for evaluating KM measures at any stage in the roadmap of a KM project. Why five? Because user-centred KM (ucKM) is, in our view, as powerful for changing business life as the human hand. And there are five fingers on a human hand. So, we will use the hand as a symbol of ucKM.

1. Constructive – "How determines What": We can look at a banana and an apple as being the same thing (food) and we can look at an apple and a billiard ball as being different things. What we see (food, apple, ball) depends on how we look at it: this is what constructive means. The act of "looking at" is represented by the index finger, because that is the finger we use to point to that to which we have given a meaning (source of different or similar visual stimuli).

2. Inseparable – "Knowledge and its owner": The act of looking at is determined by intentions, interests, wishes, hopes, expectations, etc. These human factors are highly individual and make every person inseparably bound to his or her knowledge (logic). This is represented by the second finger because this finger is the longest in the hand and this principle should be the most visible of all five.

3. Balance – "Economic constraints and human-social requirements": In order to avoid the separation of an employee from his or her knowledge, a balance between intrinsic economic constraints and human-social requirements must be maintained. This is the energy of ucKM activities and is represented by the third finger. We do not notice this finger much – but it there all the time. So the balance must also be there.

4. New Pact – "Negotiate a knowledge contract": A further contribution to avoiding the separation of an employee from his or her knowledge can be obtained if firms negotiate a new contract with their employees (in addition to the work contract) – one could say a "knowledge pact," summarized in the sentence: "You let your individual knowledge flow; we appreciate, promote, protect it and let the company's knowledge flow." Just as citizens of a state negotiate in a social pact "a form of association that may defend and protect the person and property of every associate" (Rousseau 2002: 163), similarly management and employees should also negotiate a form of knowledge association that may defend and protect the individual knowledge of every knowledge worker. This is the little finger of the hand, to remind us that even a limited, reduced pact is important. Eventually, negotiation by negotiation, the pact can contribute to bigger and bigger effects.

5. Community – "Networking and Cooperation": Without community there can be no effective knowledge management. Community provides steady networking between the two states of knowledge (tacit and explicit) and continuous interaction between individual knowledge workers. Community is the thumb of the hand, because without the thumb the hand is useless.

These five practical principles reveal a central aspect relevant to KM and a related basic tendency: the fact that we are social beings and the related basic need to balance and integrate the individual and the social element. This will become more explicit in what follows. For now, two main points should be remembered and used as guidelines for blending the individual and the social in our solution:

- There is no contradiction between the individual and the social" (Maturana & Poerksen 2004: 202). The individual and the social should not be interpreted as an opposition or dichotomy but as a duality

conceived of as a single conceptual unit that is formed by two complementary and mutually constitutive elements.

- Shared knowledge – which is a central concept in KM – can never be a copy of the same knowledge item in all the individuals of a group; it can only be a set of many different knowledge items that are "taken-as-shared" by each individual in the group (Cobb 2000: 166).

Knowledge identity

By taking seriously the characteristics and principles presented in the previous sections, we can better describe that, why and how tacit knowledge:

- is unique to each individual or group;
- must be respected as a constituent of the identity of the person – or group – who owns it;
- is something that belongs to the being, not to the having.

These insights are of such a huge importance for KM and for the task of finding a suitable model of social interaction that it is worth synthesizing them into one sentence that we call the "*Principle of Knowledge Identity*." It states that:

- Whereas explicit knowledge is something we "have," tacit knowledge is something we "are:" it is constitutive of our identity.

This principle should not be misinterpreted as an existential or ontological statement referring to something that exists independently of us. The concept of "being" involved here is, of course, a radical constructivist and operational concept of "being," consistent with Maturana's claim about what validates our explanations: "I am aware that I have no way of making reference to anything independent from me to validate my explaining and that my explaining is validated through my coherences of experience" (Maturana 1992).

By saying that "tacit knowledge is something we are," we simply want to point to the individual collection of coherences of experience that any person uses to validate her explaining and suggest viewing it as a condition of possibility for that person as a human living system. In the autopoietic model of knowing presented above, this collection is not simply an accumulation of knowledge items or products; it behaves as an assembly of functions that is integrated into the same "knowing system" that controlled its production and because this functional integration extends the faculties of knowing of the human knower, it should be considered as constitutive of human identity.

Hence, in KM, we face a similar dilemma to that in life, dealing with the two basic attitudes towards human existence (Fromm 2008): that of having and that of being. Moreover, this principle reminds us that tacit knowledge should not be separated from and dispossessed from the individual or group creating and cultivating it. Why? Because dispossessing knowledge would draw off a part of the identity and so negate the individual or group who owned it. The owner of knowledge cannot and should not be dispossessed of her tacit knowledge but should instead be recognized as the central agent from which decisions influencing quality, availability, access, use and other aspects of tacit knowledge depend. But this is something that has not been understood within the classical, traditional view of knowledge as ideas validated by reference to reality; and for this reason traditional KM has not understood how and what is necessary to put the human being at the centre.

When we accept the difference between the modes of having and being with regard to knowledge, then we can understand that transferring the methods used in the management of work to the management of knowledge creates a fundamental conflict: "How can the employee pawn his knowledge to the enterprise without doing harm to himself?" (Bettoni, Clases & Wehner 2004: 1). Moreover we will also be able to see very clearly that knowledge processes cannot be cultivated in the same way as working or performing processes. We need to find a different KM approach, one that complies both with our understanding of knowledge as the logic of experience and with a suitable model of social interaction.

Knowledge cooperation

A model of social interaction that is useful for solving KM problems with a user-centred approach and that complies with our understanding of knowledge as the logic of experience can be found in a social theory of learning, that has developed the concepts of "legitimate peripheral participation" (Lave & Wenger 1991) and "Community of Practice" (Wenger 1998), where learning is considered as a situated activity and this situated learning is a learning that takes place in the same context as that in which it is applied. In fact this is exactly what we need to achieve: that learning about a domain of work (business domain) happens in the same domain as that in which KM is applied and that this domain of work is also the context in which this learning has to be applied.

"Legitimate and peripheral" means that unqualified people are also accepted as members of the community of practice (CoP), which we understand as a group of people "who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger 2006: 1). In these times where knowledge changes so rapidly, we think that everyone is "unqualified" in a certain sense: we are always in some ways at the periphery of a practice and at the same time at the centre, too. From one point of view and for some aspects of the practice we are at the centre, but from another point of view and for other aspects of the same practice we are at the periphery. Hence it is important to accept members who enter at the periphery and also to promote or facilitate their evolution from the periphery to the centre.

Conceiving, launching and cultivating community-based KM systems is different from the traditional design and development work done for knowledge management systems that use traditional organizational structures. Communities need to be approached in the same way as living things: working with a community of practice actively and systematically is more like cultivating a plant than like building a machine. Machines or other artificial systems are built in their final state by assembling separate parts; a plant, on the contrary, does its own growing from a seed and evolves. As Wenger, McDermott & Snyder remark (2002: 12–13): "You cannot pull the stem, leaves or petals to make a plant grow faster or taller. However … you can till the soil … supply water, secure the right amount of

sun exposure." Similarly, for communities of practice you have to develop an environment in which they can prosper and "bring out the community's own internal direction, character and energy" (Wenger, McDermott & Snyder 2002: 51). Thus, a CoP, like other organisms, cannot be really "developed": working with a CoP is rather a facilitation process where an appropriate environment is created in which it can emerge, grow and flourish. For this reason we will use consistently in the following the term "cultivation" where traditionally one would speak of "development."

Design for meaning

The new and most challenging aspect of our user-centred KM concept is the way in which we design the connection between the users of the KM system: in fact our idea is to connect them in a community of practice (CoP) with the shared task of stewarding the CoP's knowledge in a participative way (Bettoni 2005). This raises the new research question of how to achieve and maintain a lasting engagement in a community of practice with such a task. One of the most common approaches to engagement in organizations is to look for incentives, for motivation (Osterloh & Frey 2000). This may be a useful perspective in many organisational development initiatives, but in the case of community-based knowledge initiatives we claim that is not enough: the incentives view of engagement should be extended by a complementary and at least equally important consideration of the issue of "meaning" (the experience that what we did, are doing or plan to do "makes sense" to us). In fact, our knowledge is, of course, strongly related to motivation but probably much more intimately connected and directly influenced by our experience of meaning. More specifically, our claim is that if we want to get enough engagement for stewarding knowledge in a community of practice, then we need to:

- Better understand the human experience of meaning (in KM tasks)
- Extend our community design with a design for meaning (in KM tasks).

A basic aspect of our engagement is that we strive to experience our actions, our practice, as meaningful. We do not simply want to get something done (a report written, an event organized, a request answered, etc.): what counts in what we do is always more than the result, it is the experience of meaning connected with that result. In the end, the meaning we produce matters even more than the product or service we deliver. The kind of meaning involved here is an experience of everyday life: the experience that what we did, are doing or plan to do "makes sense" to us. But how do we operate to produce these meanings and to put them in relation to the histories of meanings of which they are part? In his investigation of this issue Wenger (1998: 53) introduces the notion of negotiation of meaning as "the process by which we experience the world and our engagement in it as meaningful." This process has the following characteristics:

- An active, dynamic, historical process
- It affects the elements that shape it
- The meaning we experience is not imposed; it is produced, but not from scratch
- The meaning we experience is not preexisting and not simply made up
- The meaning we experience does not exist as an independent entity outside the process
- The meaning we experience exists in the process (in fieri).

What elements are necessary to constitute a process with these characteristics? Wenger proposes a model that distinguishes two constituent processes:

- A process embodied in human operators, called "participation"
- A process embodied in an artificial operand (artefact), called "reification."

The human operators contribute to the negotiation of meaning by means of their histories of interactions in the practices of a community. The artificial operand contributes to the negotiation of meaning by reflecting aspects of the practice of the community (histories of transformations). Thus the negotiation of meaning takes place as a convergence of two histories: that of the human operators and that of the artificial operands. In Wenger's model, participation is conceived of as: a) the social experience of living in the world in terms of membership of social communities; b) active involvement in social enterprises. In the same model, reification is seen as the process of giving form to our understandings, experiences, and practice by producing objects that express them. Writing down a law, producing a tool or even putting a book back in a shelf are examples of this process. Participation and reification are both distinct and complementary. They cannot be considered in isolation; they come as a pair. They form a unity in their duality (Wenger 1998: 62). According to this model, our experience of meaning is viewed as a duality, as an interplay of participation and reification, with the following implications: a) when you understand one, you should also understand the other; b) when one is given, you should wonder where the other is; c) when you enable one, you should also enable the other; d) one comes about through the other, but they cannot replace each other. By taking seriously Wenger's theory and appreciating its potential impact on KM we can now deduce the following main guideline for our design for meaning: if meaning as a constituent of a social theory of learning should be viewed as a duality of participation and reification, then engagement in stewarding knowledge should be implemented as a duality of two corresponding processes: in our case, participation in knowledge and cultivation of knowledge (Figure 6).

The lower loop, cultivation of knowledge, is the circular process by which a community collaboratively stewards its knowledge resources (by processes such as acquiring, developing, making transparent, sharing and preserving knowledge) and uses them in daily work. The upper loop, participation in knowledge, is the circular process by which community members build social capital (establish and take care of personal relationships, develop individual and collective identities, etc.) and "invest" this social capital in collaboratively stewarding the knowledge resources of their community. The three processes or groups of knowledge processes connected by means of the two learning loops mentioned are (Figure 6):

a) Stewarding knowledge: This group of knowledge processes encompasses processes such as acquiring, developing, making transparent, sharing and preserving knowledge. They are used for handing down, reproducing and renewing knowledge and experience. What should be noted here is that these processes are not considered at a cognitive level but at a coordinative-cooperative level (see the cooperation model by Wehner

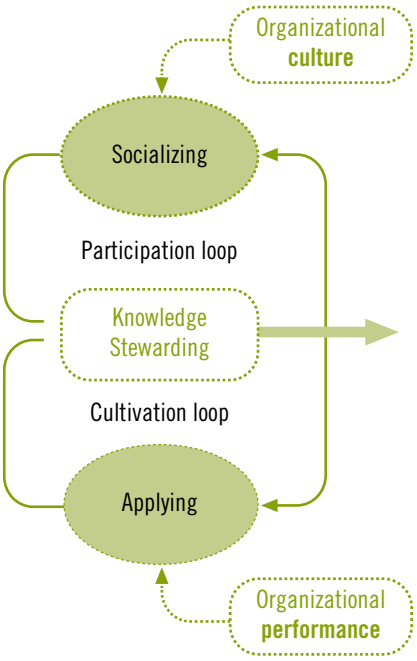


Figure 6: Circular processes of knowledge cooperation.

et al. 1998): knowledge stewarding does not therefore directly influence individual cognitive processes as alleged all too easily by certain critics of KM.

b) Applying knowledge: This group of knowledge processes collects what happens when knowledge resources are used in business processes. The learning loop of "cultivation" is established if employees of the formal organization (teams, departments) also informally participate at the same time in communities of practice (Wenger, McDermott & Snyder 2002: 18ff). This multiple membership creates a learning loop that has its focal point in the employee: she gains experiences in her daily work within business processes and can incorporate them in the community of practice where this knowledge is stewarded collectively and prepared for flowing back to the business processes from where it originated.

c) Socializing knowledge: This group of knowledge processes collects what happens in personal and institutional relationships between the people involved in stewarding and applying knowledge. Relevant dimensions to be considered here are, for example, those that lead to effective knowledge sharing such as trust, meta-knowledge, accessibility, engagement in problem-solving and safety (Cross et al. 2003). Important elements to be considered in this group are: the people involved as individual persons, their ties, their interactions (regularity, frequency and rhythm), the atmosphere, the evolution of individual and collective identities and, last but not least, spaces (physical or virtual) for meeting together. This group is very important because it allows account to be taken of the social aspects of stewarding knowledge, applying it and learning together

To conceive of and implement participation and cultivation as a duality means that they should take place together, they should both require and enable each other. There should not be any cultivation without participation or any participation without cultivation. Participation and cultivation should imply each other. Increasing the level of cultivation should not replace an equal amount of participation; on the contrary it should tend to require an increase in participation. Cultivation of knowledge should always rest on participation in knowledge: applying knowledge requires a history of participation as a context for its interpretation. In turn, participation in knowledge should also rest on cultivation because it always involves words, concepts and artifacts that allow it to proceed. Finally, the processes of participation (embodied in people) and cultivation (embodied in artefacts) should not be considered just as a distinction between people (human operators) and explicit knowledge (artificial operands, things). In terms of meaning, people and things cannot be defined independently of each other. On the one hand our sense of ourselves includes the objects of our practice; on the other hand what these objects are depends on the people that shape them through their experiences.

Architecture of a user-centred KM system

The need to explain in project meetings our view of a user-centred solution for a real KM problem led us to develop a systemic assembly view, an architecture that clarifies how the previously mentioned concepts and approaches can be assembled in a practical application.

One aspect of a system to be designed is its structure. The structure is important because it determines in certain ways the future function; and since we wanted a function that is collaborative (cooperative), we selected the "social network" as a structure. A network structure was attractive as a framework for collaboration because of its way of balancing responsibilities: instead of having the classical hierarchical system, which allocates lower responsibilities at lower levels, the network structure would allow equal responsibilities to be allocated to each researcher.

A second aspect to be designed was the dynamics of this system, the processes. One aspect of dynamics is the interaction in the community and another aspect – since the dynamics are to do with organizational knowledge and learning – is the "knowledge management processes."

As the method of interaction, we selected – consistently with the user-centred approach that we wanted to implement – the Community of Practice method, and as regards the tools that enable the community interactions, we decided to use a Web 2.0 approach. As regards the system component "knowledge management," the task that we identified was "to collaboratively steward research knowledge" and we had to select an approach for implementing this task. Given the defects analysis that we presented at the beginning of this paper, we had many reasons to expect that traditional KM would not fit our user-centred approach. So we decided to rely on our new approach to KM, called "Knowledge Cooperation" (see above).

Community of Research (CoRe)

A unique opportunity to practice and test empirically what we have preached in the previous sections appeared in the Fall of 2005 when the first author was appointed to lead research at our distance-learning university (2005) and the director gave him a set of very ambitious strategic objectives for research and development (R&D)! First of all he had to increase the quality of projects – quality of sponsors, quality of outcomes – then the number of grants and the amount

of funds also had to increase and, last but not least, the degree of integration between teaching and research had to be improved (Bettoni, Schiller & Bernhard 2008).

How can research be designed, organized and implemented in order to reach these objectives? From conversations and meetings with colleagues, with the researchers, and with the conceptual background previously presented, we decided to design the organisation of research to focus on an online collaborative knowledge strategy that consisted of three main lines of action: increasing connectedness, community learning and collaboration on knowledge.

How should these collaborative lines of action be implemented? When asking this question, the means of reaching the strategic objectives become ends. What was clear to us was that we needed a collective effort to meet these ambitious objectives and to implement these lines of action. So we became designers of collaborative research and decided to design a community of researchers (CoRe) that would "pull the weight" together by implementing our model of a user-centred KM system.

Moreover, the community would not only be the origin of these lines of action, which would eventually meet the objectives: the objectives themselves would be measured, and the community would act as a kind of "controller" in a feedback loop. To accomplish this function, CoRe would measure the missing degree of attainment of the objectives – which in cybernetics is called the "error" – and by evaluating this error and by self-organizing, accordingly change its own organization and improve the attainment of the objectives.

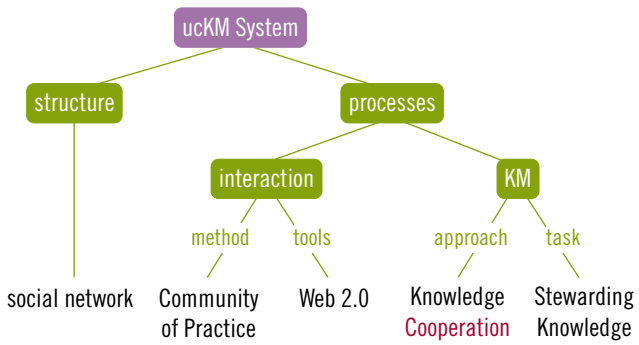


Figure 7: Architecture of a user-centred KM system.

Community design and platform

Viewed as a social structure, CoRe is made up of seven basic elements, seven interactions and cooperation areas, which correspond to aspects of community life. The individual elements are: 1. Community, 2. Practice, 3. Domain, 4. Leadership, 5. Individual, 6. Connections and 7. Resource Development (Figure 8).

This design is based on Etienne Wenger's social theory of learning (Wenger 1998) and on his international online workshop, "Foundations of Communities of Practice" (CPsquare 2006). The first three of these elements are the fundamental elements of a CoP: a domain of knowledge, which defines a set of issues; a community of people who care about this domain; and the shared practice that they are developing to be effective in their domain (Wenger, McDermott & Snyder 2002). It is here that the main part of CoRe activities takes place and it is this triad of areas that needs to be cultivated first. The next three elements – leadership, individual and connections – build the peripheral framework of CoRe, such as an interface to the outside or a membrane that regulates what enters and exits the central part of CoRe. Finally, the seventh area is where members of the community interact and cooperate to support the structural and functional needs of CoRe by developing the resources needed by the previous six structural elements.

Since CoRe was conceived of as a distributed, online community, interactions among its members were supported by an online collaboration platform on MOODLE (Modular Object-Oriented Dynamic Learning Environment, http://moodle.org/) called "CoRe Square," a virtual space for meeting and stewarding research knowledge. The CoRe Square platform is designed as a "community cooperation space" for research tasks: for each aspect of community life in CoRe there is a corresponding cooperation area in CoRe Square collecting a specific set of resources that support and facilitate the activities in that area.

Phases of the experiment

The CoRe project was started by the first author in October 2005 as a pilot project with the objective of creating and cultivating a prototype of the CoRe network. This community pilot project was planned to end in December 2008 and run through 4 phases:

1 | *Planning* = defining the project and preparing all community components.
2 | *Resources* = community launch, resources development, informal assessment.
3 | *Practicing* = community maturation and practice development.
4 | *Outcomes* = resources validation, project evaluation and transfer.

In Phase 1 ("Planning" – between October 2005 and May 2006), we began by sketching a project definition (business case) and then worked on preparing all community components. This involved creating ideas and models of how the community might work, starting the development of a community core group, and beginning to address basic cultural issues as well as preparing the organizational and technical infrastructure (the MOODLE platform, "CoRe Square").

In Phase 2 ("Resources" – between June 2006 and June 2007), the CoRe network prototype started its activities with 45 members that participated in a two-day "Future Search" conference. During this meeting we identified four main topics for the development of the community in its first year: a) competence analysis, b) research strategy, c)

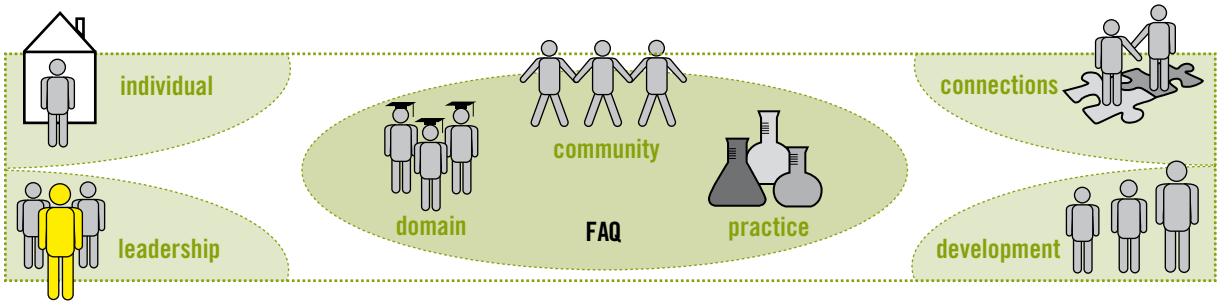


Figure 8: Elements of CoRe.

incentives system and d) communication. Our approach to addressing these topics was to build a strong core team and have its members work – with the support of the other community members – on the development of four community resources: a competence tool (Bettoni et al. 2007), a research strategy with a draft research plan, an incentives plan and an internet site about research at FFHS. After one year, in June 2007, during the "1st Annual CoRe Conference," we made an informal check on the community's health to see whether the community-building was on the right track. In particular, we collected feedback on the following issues: how members experienced the first year of the community, their thinking on the work that had been done in developing the four resources, their understanding of the plans for the second year of CoRe and finally their wishes, expectations and positive ideas for contributing to the success of the community.

Phase 3 ("Practising") was planned to last from July 2007 to June 2008. Based on the informal assessment completed in Phase 2, activities in this year of community growth began with a first report on the efforts of the project so far, including an outline of recommendations. After evaluating these recommendations it was planned that their implementation would guide the second phase of community cultivation, which had to focus on strengthening the community and contributing to the development of research practice by focusing on projects and on "open cooperation," i.e., a new way of collaborating on research projects whose steps, procedures, methods and structures are visible to the whole community (Bernhard & Bettoni 2007).

Finally in Phase 4 ("Outcomes" – from July to December 2008), work was planned to address the questions of how to justify the organization's investment and what we learned in the CoRe project. To this end, we wanted to focus on the qualitative and quantitative evaluation of the two main strategic efforts of the project: improving the FFHS research performances and developing a community-oriented strategy for integrating teaching and research.

Due to a reorganization of the hierarchical structures at our university, which lasted from November 2007 to April 2008, the pilot project was interrupted. CoRe hibernated for one year and awoke again in November 2008. Since then it has been running under the new name of "eDolphin" with a modified approach based on bioteaming (Bettoni, Schiller & Bernhard 2008) and is undergoing some essential modifications to take into consideration not only the lessons learned from the first year but also the new organizational structures.

Lessons learned

With the help of an informal check on the CoRe's health made after one year of the community's life, our experience with this experiment can be summarized in the following lessons learned.

First of all the CoRe experiment showed that by means of our user-centred KM system implementing a constructivist and socialized approach to KM, it was possible to deliver connectedness, that community learning was happening and that collaboration on knowledge was underway.

Unfortunately there were also two problems concerning the steering of the experiment. The first steering problem originated in the contradiction between network and hierarchy (organizational structure), which in our organization led to a power struggle. The project leader (the first author) did not become aware enough of the importance of this power struggle and did not notice that the project was in danger. The second steering problem was that the project leader did not succeed in managing stakeholders' expectations, especially in understanding top management's perceptions of the value of this experiment and if this was much lower than the actual value delivered, in educating the boss and in showing that in fact the delivered value was higher than that which he perceived.

There were some further insights regarding the expectations and perceived value from the point of view of the community members. Self-organization and voluntary participation – two essential principles of CoRe – were a big challenge for many community members and after one year they expressed the wish for less autonomy, more mandatory interactions, and more mandatory use of tools. In this regard our analysis was that there are a few problems; for example, the following three, which we called "the silent novice," "prototype deadlock" and "voluntary is not serious":

- *"The silent novice:"* When members feel that their expertise level is more that of a novice than that of a competent or proficient professional, then participation in discussions can be low if people belong to a linear-active culture (Lewis 2003), such as Germans and Swiss-Germans (our case). Since they highly value "facts and figures," they are more likely to feel

uncomfortable when they cannot provide them.

- *"Prototype deadlock:"* To support one-to-one interactions, we had created a tool for competence analysis, visualization and interaction called the "Yellow Tool" (Bettoni et al. 2007). In the first year our tool was a prototype: it needed users that *jump in*, in order to improve it; CoRe members were instead *leaning back*, waiting for the tool to be improved before using it for their interactions. Using and improving the propotype were both waiting for the other activity to finish and thus neither ever took place: a typical deadlock that prevented people from using this opportunity for interacting, exploring who is who and understanding who knows what.
- *"Voluntary is not serious."* Projects are wonderful opportunities for networking and engaging in collaborative activities that in turn can promote a strong sense of belonging. In the first year, members of CoRe started a lot of research projects but still did that on an individual basis without trying to connect online with other CoRe members by means of CoRe Square and thus failing to include them in their perspective. One cause for this disconnected approach could have come from our Central European education system in which work and voluntary activities are strictly separated: the first considered "serious but not fun;" the second "fun but not serious." As a consequence, the unusual idea of "volunteering for work" – as in CoRe – was intuitively and unawarely seen as not serious or even impossible.

Finally we realized that for leading the conversational type of collaboration that characterizes Knowledge Cooperation we needed a new kind of competence, which is a kind of "facilitative leadership" (Libert 2008): anyone who – in the Community of Research – acts as a leader must be able to lead *negotiations of meaning*, a new kind of group interaction that produces consensus in knowledge and consensus in ways of dealing with knowledge.

In summary, these results show a clear challenge in implementing a user-centred KM based on Knowledge Cooperation: that of balancing self-governance, self-organization and voluntary participation on one side and stronger guidance, obligatory interactions and mandatory use of tools (CoRe Square) on the other side. Thus we saw a clear emergence of a tension between two opposing tendencies: autonomy and guidance. We in the project team were convinced that CoRe had made important steps forward and were confident that we would have been able to cope with the above-mentioned tension and challenge.

Conclusion

In this paper we have shown a set of seven interrelated means for implementing a user-centred KM:

- a defect analysis of KM, based on lessons learned from Artificial Intelligence;
- the concept of knowledge as the "Logic of Experience," our understanding of knowledge made explicit by articulating it in five essential aspects, inspired by radical constructivism;
- a set of five practical principles to be used for designing KM solutions that balance the individual and the social element;
- the principle of "Knowledge Identity" as a guideline for finding a suitable model of social interaction;
- the model of "Knowledge Cooperation" as a way of blending the Community of Practice model of social interaction with our understanding of knowledge as the logic of experience;
- the architecture of a user-centred KM system assembling the previously mentioned concepts and approaches;
- insights from evaluating the results of an experiment in which we have practiced what we preach by implementing our user-centred KM approach in a community of researchers called CoRe.

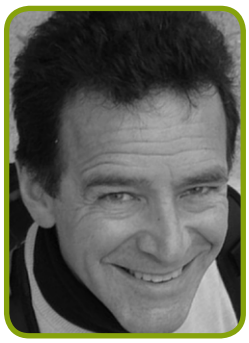
The CoRe experiment confirmed that by means of our user-centred KM solution implementing a constructivist and socialized approach to KM, it is possible to deliver connectedness, to support community learning and to connect users of the KM system with the shared task of stewarding the users' knowledge in a participative way.

Hence its difficulties should not be interpreted as a weakness in the underlying constructivist and socialized perspective; their causes are rather to be found in the steering of the project and point to a fundamental issue and a related question. The issue regards economies in general: we need to understand better how a *knowledge economy* differs from our traditional capitalist *work economy*. The question regarding implications of this issue at the level of organizational development is: How can a hierarchical organization focused on *performing work* be changed to also integrate a network structure focused on *stewarding knowledge*?

As mentioned in the Gartner report, KM systems failed when they missed the point that knowledge resides in people: in other words, when they put technology at the centre of the KM system and disregarded the essential role of people, both as individuals and as social beings.

Our results show that this problem does not reside in the systemic approach as such, but in a technology-centred approach that causes a wrong selection of the elements and relationships that constitute the KM system. Our concept of a user-centred KM and the means for implementing it described in this paper confirm the usefulness of a radical constructivist and social oriented approach; in our experiment the KM system was designed in an open way that allowed us to both identify and to take seriously the concerns and fears of the individuals as well as obstacles in developing connectedness and interactions among them. However, these processes need time (for growing, for the analysis, for taking measures) and when this need is not clarified, communicated and discussed with all stakeholders from the beginning (for instance by means of change management methods), then false expectations can tacitly arise and lead too soon to disappointment and inappropriate reactions.

Hence the most urgent improvement should address this issue of clarifying, communicating and discussing the time scale of when what result can be achieved, and accordingly negotiate shared expectations. This negotiation could generate resistance and opposition but would at the same time also lead to an improvement in the implementation of knowledge cooperation thanks to a better understanding of the needs and fears of participants as they arise and evolve during the implementation of the KM solu-



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tion. This improved understanding would especially occur in relation to the adoption of new communication technologies supporting the interactions and – more importantly – of new ways of working and leading (Libert 2008), which are needed for collaboratively stewarding knowledge in an online community.

Future research should urgently address the issues of "leadership in a knowledge economy," "knowledge identity" and "the knowledge contract" and KM practice should align its conception of a user-centred KM in conformity with the principle of "knowledge identity."

In a user-centred KM, the user who wishes to be successful needs to create a personal social network and for doing this he should stop trying to subjugate his target partner by means of power, as in a traditional hierarchy of a traditional company. Instead he should begin to become attractive by means such as helpfulness, empathy and an appreciative habit of mind. It is in this principle of love that we see the future of knowledge management and of the knowledge economy.

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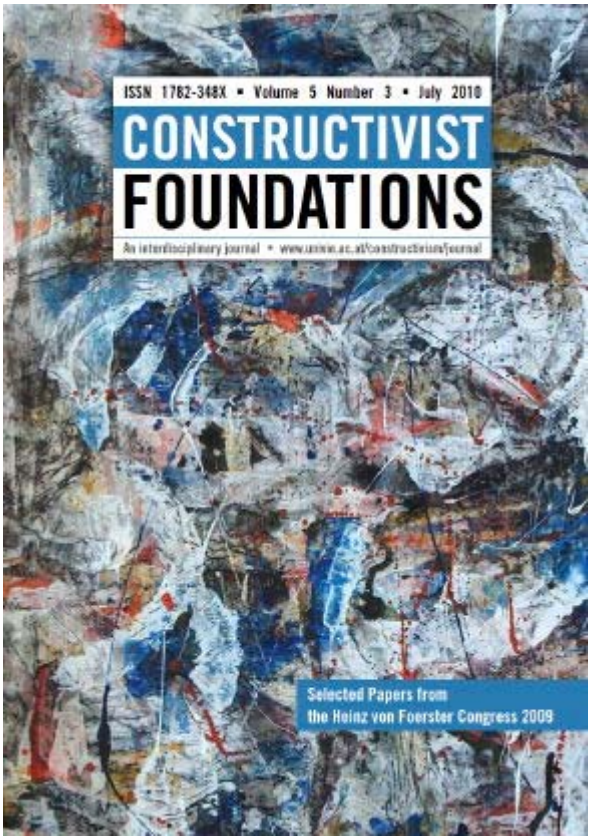

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