Making & organising knowledge in communities
— *a review of literature and concepts by Conrad Taylor*

The topic and scope of the conference *Making and Organising Knowledge in Communities,* a joint enterprise of the KIDMM community[1] and ISKO-UK[2], has been for me a stimulus to explore the literature. Without any prejudice to the way our discussions might evolve on 9th October 2008, I thought it would be useful to set out some of the ideas that I have found in that literature, and to share my reflections upon them. These notes also build on my document of half a year ago, *Towards making knowledge in communities.*

What do we know about knowledge?

> *We consider knowledge and learning… with some trepidation. On the one hand, epistemology, the theory of knowledge, has formed the centerpiece of heavyweight philosophical arguments for millenia. On the other, knowledge management has many aspects of another lightweight fad. That enemy of lightweights,* The Economist, *has pronounced it no more than a buzzword. We may, then, be trying to lift a gun too heavy to handle to aim at a target too insubstantial to matter.*
>
> — *John Seely Brown and Paul Duguid (2000)*

Some of my colleagues urged me to stay away from investigating definitions of knowledge; that we would get sucked thereby into an epistemological vortex and get nowhere. However, the word 'knowledge' appears in the names both of KIDMM and ISKO, and within the British Computer Society there has been talk of 'knowledge communities', so I don't really think we can duck it.

Philosophical dead-ends

Both in Western and Islamic thought there is a skein of tradition, woven from Abrahamic & Greek origins, in which there are said to be absolute truths which can be known with certainty. This is not a concept of knowledge which can be lightly ignored, because there are many individuals and indeed communities who think this way. However, I suggest we should set this concept aside, because:

◆ debates about the nature of truth and ultimate reality tend to drag discussion to giddy heights, in which we are likely to learn nothing; and

◆ this tradition tends to lead people to the perspective that they are right and others are wrong, which does not bode well for constructing knowledge in communities.

Knowledge and information

There is a field of practice called Knowledge Management (KM), and I made this the starting-point of my investigations. In an article in *Information Research*, Paul Hildreth and Chris Kimble (2002) describe the slippery nature of the term:

> *It is clear from looking at the literature on knowledge management (KM) that the term knowledge suffers from a high degree of what might be called 'terminological ambiguity' and often requires a host of adjectives to make clear exactly in what sense it is being used. When something is to be managed many people feel that in order to do this it must be quantified, counted, organised and measured (Glaser, 1998); it must be able to be built, owned and controlled if its value is to be maximised (Allee, 1997). As a result, approaches to KM have tended to concentrate on attempts to capture and control what is sometimes called 'structured knowledge'.*

Hildreth & Kimble wryly note that this approach to knowledge is dominated by technology, and that what is presented as KM is often just Information Resource Management (IRM) – re-labelled as a marketing ploy.

Knowledge is what people know

However, these authors point to a more recent trend towards recognising that 'there are aspects of knowledge – broadly what people know – which cannot be articulated, abstracted, codified, captured and stored.' This is sometimes called 'less structured knowledge'. Hildreth and Kimble propose 'soft knowledge' as a working term for what cannot be articulated, and 'hard knowledge' for knowledge which is capable of such treatment.

Liz Orna's perspective on knowledge

In *Information Strategy in Practice* (2004), Elizabeth Orna offered the following definition of knowledge:

> *Knowledge is what we acquire from our interaction with the world; it is the result of experiences organised and stored inside each individual's own mind in a way that is unique to each (though there are features common to how we all do this). It comes in two main kinds: knowledge about things, and know-how, and our knowledge is available to us at various levels from 'tacit' – what we know and use without expressing it in words, to 'explicit' – what we can readily formulate and explain…*

> *Knowledge also depends on memory – and memory too come sin two kinds: internal –inside our heads, and external – knowledge transformed into information… and put into external stores like libraries or databases or reference books so that we don't have to try to carry everything we need in our heads.*

As for the relationship between knowledge and information, Orna adds:

> *Information is what human beings transform their knowledge into when they want to communicate it to other people. It is knowledge made visible or audible, in written or printed words, or in speech.*

I would extend this definition in two ways. Firstly, we can convey our knowledge also through diagrams, animations, films and other forms of information presentation. Secondly, we also transfer knowledge into information products for our own benefit: consider diaries and address books, for example. Donald Norman would call these 'cognitive artefacts'.

Seely Brown & Duguid: knowledge vs. information.

In *The Social Life of Information*, John Seely Brown and Paul Duguid identify three generally accepted distinctions between knowledge and information:

- Knowledge generally implies a knower. It seems odd to ask 'Where's that knowledge?' and more natural to ask 'Who knows that?'

- Knowledge appears more difficult to 'detach' from the people who know it. Unlike information, knowledge 'doesn't take as kindly to ideas of shipping, receiving and quantification… It is hard to pick up and hard to transfer.'

- Knowledge may be hard to give and receive because it requires more in the way of assimilation: it must be digested, and entails understanding and 'a degree of commitment'. While we may have conflicting information, we don't have conflicting knowledge.

Tacit knowledge

In the passages quoted above, Liz Orna referred to some knowledge as being 'tacit', and explained that as meaning what we know and use without putting it into words. The origins of this idea are often credited to Michael Polyani who in 1967 wrote a book, *The Tacit Dimension*, containing the famous formula that 'we can know more than we can tell'.

This simple phrase, and the related term 'tacit knowledge', have however been variously interpreted by later writers. My understanding is that Polanyi was drawing attention to a tacit dimension to all knowing: 'The knowledge that underlies explicit knowledge is more fundamental; all knowledge is either tacit or rooted in tacit knowledge.' I believe that in Polanyi's thinking, tacit knowledge is a set of internalised experiences, habits, practices and concepts which necessarily precede discovery, and which may in some cases be transmuted into explicit knowledge.

Within KM literature, the distinction between tacit and explicit knowledge has been popularised by Ikujiro Nonaka. In a 1998 article co-authored with Noboru Konno, the distinction is expressed thus:

> *There are two kinds of knowledge: explicit knowledge and tacit knowledge. Explicit knowledge can be expressed in words and number and shared in the form of data, scientific formulae, specifications, manuals and the like. This kind of knowledge can be readily transmitted between individuals formally and systematically. In the West, in general, this form of knowledge has been emphasized. Many Japanese, however, view knowledge as being primarily tacit, something not easily visible and expressible. Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or share with others. Subjective insights, intuitions and hunches fall into this category of knowledge. Tacit knowledge is deeply rooted in an individual's actions and experience as well as in the ideals, values or emotions he or she embraces.*

> *There are two dimensions to tacit knowledge. The first is the technical dimension, which encompasses the kind of informal personal skills or crafts often referred to as 'know-how'. The second is the cognitive dimension. It consists of beliefs, ideals, values, schemata and mental models which are deeply ingrained in us and which we often take for granted. While difficult to articulate, this cognitive dimension of tacit knowledge shapes the way we perceive the world.*

Know-that and know-how

Seely Brown and Duguid note that the philosopher Gilbert Ryle drew a distinction between *know-that* and *know-how* – and said that we develop know-how by practice.

Polar distinctions such as [tacit—explicit] or [know-how—know-that] need not be interpreted as hard dichotomies. Consider, for example, learning to read music and play a musical instrument. One cannot learn these skills efficiently just by imitation. A good music teacher finds ways of formulating rules and mental models and instructions which can be conveyed to the student, by verbal explanation combined with demonstration. The 'know-how' is conveyed in part as 'know-that'.

In the early stages of learning to play the flute, I found, it is mentally quite exhausting to process this 'explicitified' knowledge. But eventually it becomes 'second nature' and is 're-tacitified'. There are many similar skills that have sunk down into the tacit layer, for which we may be grateful every time we drive a car or ride a bike. Indeed unless I remind you, you won't have considered all the tacit knowledge you deploy to read these words and make sense of the English language.

Learning about, learning to be

Seely Brown and Duguid note that the cognitive and educational psychologist Jerome Bruner makes a somewhat related distinction to Ryle's: between *learning about* and *learning to be*. Learning to be requires more than just the provision of information. It also requires the ability to engage in the practice in question. Within many fields, it is important to have both kinds of learning.

Learning and teaching themselves are good examples of why both kinds of learning are important. We all know how disastrous is the university lecturer who is the world expert in his subject, but has no ability whatsoever to teach it. Thank goodness that the school system doesn't these days employ graduates of, say, chemistry or modern languages without also ensuring that they have undergone teacher training. It is also important for the student to learn how to study effectively, and researchers to learn the research methodologies that are appropriate to their field.

Seely Brown and Duguid (2000) emphasise the social aspect of learning, and how it interplays both with the development of identity and one's relationship to community:

> In learning to be, in becoming a member of a community of practice, an individual is developing a social identity. In turn, the identity under development shapes what that person comes to know, how he or she assimilates knowledge and information. So, even when people are learning about, in Bruner's terms, the identity they are developing determines what they pay attention to and what they learn. What people learn about, then, is always refracted through who they are and what they are learning to be.

Sharing knowledge over breakfast

We could do with an industrial example, and I would like to start with one described by Seely Brown and Duguid (2000), based on a study by the anthropologist Julian Orr of the practices of Xerox's technical representatives ('reps') who service and repair Xerox copiers on customers' sites.

In theory, when a copier breaks down, the rep makes a site visit, tests the machine, reads off the diagnostic codes, studies the documentation to see what has gone wrong, and fixes the machine. In practice, as the copiers evolved into more and more complex systems, they exhibited behaviours that defied logic and certainly weren't described in the manual. Also, the manuals gave instructions; they didn't explain the inner working of the copiers to the reps. So when a copier started behaving in an 'undocumented' way, the reps hadn't a clue.

Orr found that the reps responded by getting together regularly for breakfast, lunch and at the end of the day…

> This sociability wasn't simply a retreat from the loneliness of an isolating job. At these meetings, while eating, playing cribbage, and engaging in what might seem like idle gossip, the reps talked work, and talked it continuously. They posed questions, raised problems, offered solutions, constructed answers, and discussed changes in their work, the machines, or customer relations. In this way, both directly and indirectly, they kept one another up to date with what they knew, what they learned, and what they did.

Through this regular social engagement, the reps formed a collective pool of knowledge and insight (and, by the way, spare parts). They also developed a recognition of the various expertises of individuals in the group. To its credit, Xerox built on this spontaneous networking by issuing the reps with walkie-talkies, so they could get in touch while on the job, if they got stuck.

The company also recognised that this sharing of insight tended to have a short reach and a short life: informal networking was limited to localities, and knowledge tended to fade from memory. This led to the development of the Eureka database, to which the reps were encouraged to contribute the useful knowledge which they were gaining on the job. Eureka is reckoned to save Xerox up to $100 million a year in service costs: a clear example of the potential benefits of making and organising knowledge in communities.

Introducing Communities of Practice

The social scientist Etienne Wenger has credited his colleague Jean Lave with coining the phrase 'Communities of Practice'. The concept is explained systematically in Wenger's 1998 book *Communities of Practice: Learning, Meaning, and Identity*. This was based on an analysis of the working practices and social relationships between claims processors at an American medical insurance company, anonymised as 'Alinsu'.

To explain the term, Wenger starts thus:

Being alive as human beings means that we are constantly engaged in the pursuit of enterprises of all kinds, from ensuring our physical survival to seeking the most lofty pleasures. As we define these enterprises and engage in their pursuit together, we interact with each other and with the world accordingly. In other words, we learn.

Over time, this collective learning results in practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore, to call these kinds of communities **communities of practice.**

A community of practice (CoP for short) consist of people who are employed by the same company, like the claims processors at 'Alinsu' – or engineers at Airbus or Fujitsu UK, to mention two communities who will be represented at our conference. Members of CoPs like this may spend a significant part of their lives in contact with each other. Other CoPs may entail less intense and daily contacts, such as people in World Wide Web Consortium working groups, or members of a specialist group within a professional society.

As for what constitutes 'practice', that too is defined broadly by Wenger: for example, 'Some communities specialise in the production of theories, but that too is a practice.' Unpicking what may be involved in a 'practice', Wenger elaborates:

Within any practice, there will be found many explicit processes and factors. These will include the kind of language used, tools and documents, defined roles and processes, regulations and perhaps standards. However, there are also many things that are implicit or tacit: implicit relations and tacit conventions, cues and rules of thumb, underlying assumptions and shared world views.

The negotiation of meaning

Etienne Wenger usefully focuses on a process within such communities which he calls the negotiation of meaning – 'the process by which we experience the world and our engagement with it as meaningful.'

Etienne Wenger's diagram of participation and reification.
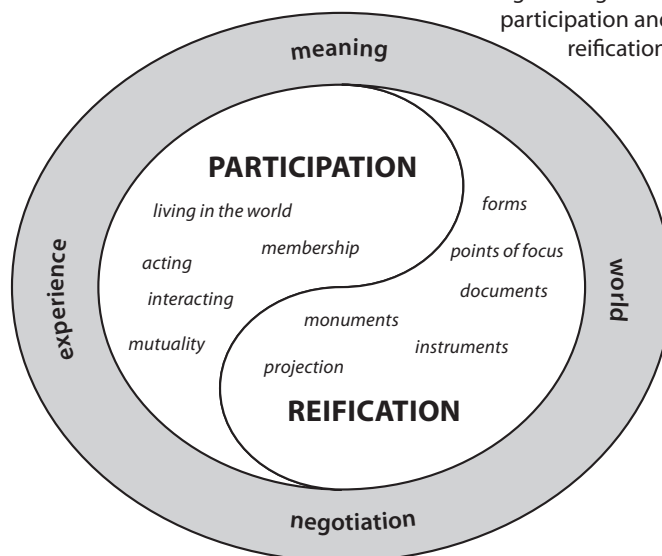
I intend the term negotiation to convey a flavour of continuous interaction, of gradual achievement, and of give-and-take. By living in the world we do not just make meanings up independently of the world, but neither does the world simply impose meanings on us. The negotiation of meaning is a productive process, but negotiating meaning is not constructing it from scratch. Meaning is not pre-existing, but neither is it simply made up. Negotiated meaning is at once both historical and dynamic, contextual and unique.

Participation and reification

For Wenger, the negotiation of meaning involves the continuous interaction of two complementary processes. These are participation and reification, and 'they come as a pair… they form a unity in their duality' (*see diagram above*).

Participation, for Wenger, is 'the social experience of living in the world in terms of membership of social communities and active involvement in social enterprises.' He goes on:

It is a complex process that combines doing, talking, thinking, feeling and belonging. It involves our whole person, including our bodies, minds, emotions and social relations.

Wenger clarifies that his view of participation is not a rose-tinted one. Participation in a community may not be on equal terms with others, or mutually rewarding, and it can be conflictual. But participation is essential to the negotiation of meaning in any such community. Also, one does not actually have to be in communication with others to experience aspects of participation: 'participation is not something we turn on and off… it is a constituent of our identities.'

It is more difficult to understand reification, but no less important. Wenger describes reification as treating an abstraction as substantially existing:

'We project our meanings into the world and then we perceive them as existing in the world.' Taking an example from the world of claims processors:

> *A medical claim, for instance, reifies in its form a complex web of conventions, agreements, expectations, commitments and obligations, including (on the part of medical professionals) the right to bill for certain services and the obligation to do so in a standardized way and (on the part of the insurance company) the right to decide if the claim is legitimate and duly filled out, together with the obligation to honor the claim if it is.*

In presenting a long list of examples of reifications, Wenger includes some that are physical objects ('from dolmens to space probes'), some that are conceptual ('from names to classification systems') and some that are events ('the evening news… tortuous political speeches'). What they have in common is that 'aspects of human experience and practice are congealed into fixed forms and given the status of an object… Properly speaking , the products of reification are not simply concrete, material objects. Rather, they are reflections of these practices, tokens of vast expanses of human meanings.'

Engagement, enterprise, repertoire

The coherence of a community of practice, says Wenger, is rooted in its practice, and this has three dimensions:

- mutual engagement
- a joint enterprise
- a shared repertoire.

Repertoire in this context is a very rich and useful concept, and includes 'routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions or concepts.' So, for example, on KIDMM's JISCmail email discussion list (BCS-KIDMM), the email list itself is part of the repertoire as a tool, but the repertoire also includes the kinds of specialist vocabulary used, the semi-tacit sense of what is appropriate to write about and what is off-topic, and to varying degrees a shared memory of what has been discussed in the past.

The repertoire of a community combines both reificative and participatory aspects. It includes the discourse by which members create meaningful statements about the world, as well as the styles by which they express their forms of membership and their identities as members.

Knowledge communities

Etienne Wenger confesses a reluctance to use the word knowledge, which he characterises as 'tricky', doubtless for the same kinds of reason as Seely Brown and Paul Duguid identify. Wenger prefers to use terms such as experience, meaning, competence, learning, and knowing in practice. Discourse about knowledge requires a broader context.

> *What we dare consider knowledge is not just a matter of our own experiences of meaning or even our own regimes of competence. It is also a matter of the positions of our practices with respect to the broader historical, social and institutional discourses and styles (e.g. scietific, religious, political, artistic) to which we orient our practices in various ways and to which we can thus be more or less accountable.*

However, let us be bold. There are and for a long time have been communities specialising in the aim of advancing knowledge. In early civilisations, they were brought together by royal initiative, as in the great library and translation/transcription bureau organised by Ashurbanipal at Nineveh circa 640 BCE, or the 5th-century Persian academy founded by Khusrau I at Gundishapur.

Incidentally, it is interesting that some of the most vital of these enterprises had the function of integrating bodies of knowledge across cultural and linguistic boundaries, whether it was the Assyrian assimilation of Babylonian ideas (at Nineveh), Persians gathering Indian mathematics and medical knowledge (at Gundishapur), Arabs drawing on Greek and Indian ideas (Bayt al-Hikma, Baghdad, 762 CE) or Spanish Christians translating Arabic works into Latin (12th century Toledo).

The vitality of these centres of learning doubtless was forced along by the scholarly community's need to critically analyse, accept or reject, improve, annotate and codify the incoming ideas, and attempt to integrate them into the home culture. And around the later of these institutions formed what would be the precursors of the modern university system and the teaching hospitals.

In the 16th century we see the beginnings of an idea and practice which became influential in Europe: the 'invisible college', a network of intellectuals who exchanged ideas through the postal system and the exchange of books in which marginal notes might be appended. Johannes Kepler, John Dee and Tycho Brahe participated in such networks.

In the 1640s in England, The Invisible College was adopted as the name of the informal confederation of such scientists as Robert Boyle, John Evelyn, Robert

Hooke, William Petty, John Wallis, John Wilkins, Christopher Wren. As is well known, in 1660–62 this group gained the patronage of the newly-restored monarchy of King Charles II and founded the 'Royal Society of London for the Improvement of Natural Knowledge' (now, The Royal Society).

Learned and Professional Societies today

From such beginnings (also influenced by the guild tradition) we now have numerous learned societies, and also professional societies which seek both the continuous professional development and edification of their members, and the fostering of knowledge for the benefit of society at large.

For example, the British Computer Society, which is incorporated as a charity, which has as its objects *to promote the study and practice of Computing and to advance knowledge and education therein for the benefit of the public*. In practice, within the BCS, this aspect of the Society's mission is expressed most clearly in the work of the Specialist Groups and the Forums. And, of course, in a much less formal way – almost as a technologically-empowered 'invisible college' – in KIDMM, which was born within the BCS but which is also open to external participation.

On 9th October we shall also hear the experience of the Chartered Institute of Library and Information Professionals (CILIP), who likewise have within their general membership a number of special interest groups and have been experimenting with taking some of this knowledge-sharing activity online as 'Knowledge Communities'.

Likewise we will hear Marilyn Leask's experiences in the setting up of two electronic knowledge-sharing networks for teachers (*Teachernet* and *European SchoolNet*) and one for sharing best practice ideas among people working in the UK local government sector (*I&DeA Communities of Practice for Local Government*).

Boundaries, brokers and objects

Of great interest in the modern world is the matter of interdisciplinary study and practice, which brings previously isolated communities of practice into contact and communion with each other. The KIDMM community owes its origins to the will of a number of Specialist Group members at a BCS Specialist Groups Assembly to explore overlaps between their different perspective on data, information and knowledges.

Some people who participated in our pre-KIDMM discussions already belonged to other (i.e. non-BCS) communities: this was for example true of Electronic Publishing SG with its links to librarianship, design,

media industries etc. Therefore, given KIDMM's open structure, it didn't take long before publishers, museum and heritage personnel, archivists and librarians and information scientists also joined in the fray.

Wenger pays careful attention to what happens at the boundaries between CoPs, and notes two ways in which they are bridged: the activities of 'brokers', and the role of 'boundary objects'.

Brokers

Brokers are defined by Wenger as people who belong to two or more CoPs, and play a personal active role in the exchange of ideas between them:

> *Certain individuals seem to thrive on being brokers: they love to create connections and engage in 'import–export', and so would rather stay at the boundaries of many practices than move to the core of any one practice.*

> *[Brokering] involves processes of translation, co-ordination and alignment between perspectives… It also requires the ability to link practices by facilitating transactions between them, and to cause learning by introducing into a practice elements of another… what brokers press into service to connect practice is their experience of multimembership and the possibilities for negotiation inherent in participation.*

Boundary objects

This is a term coined by Susan Leigh Star, co-author of the book *Sorting Things Out: Classification and its Consequences*. Boundary objects are reifications which co-ordinate the perspectives of various constituencies, to some end.

In Wenger's 'Alinsu' case study, he identified claim forms as boundary objects that mediate between the practices of patients, doctors and insurers. In other situations, documents or journals may play this role.

> *The design of artifacts – documents, systems, tools – is often the design of boundary objects… designing them is designing for participation rather than just use… Connecting the communities involved, understanding practices, and managing boundaries become fundamental design tasks.*

Though they do not as naturally acquire the label 'object', events such as annual congresses (or, within the BCS, the six-monthly Specialist Groups Assemblies) may be seen as institutional reifications that work at bridging the boundaries between groups; the ISKO-UK 'KoKo' (*Konnecting Kommunities*) events are intended to work similarly.

Hildreth and Kimble point out that many boundary objects must convey information over distances, and have to be 'robust' enough to travel between communities, while being capable of local interpretation:

The different local interpretations, or interpretive flexibility, of boundary objects means that the knowledge embedded in an artefact during its creation is not simply re-extracted, but that a degree of knowledge is necessary to be able to make use of it. That is, knowledge is embedded in the artefact but additional knowledge is required to use it.

Wenger describes the role artefacts play in connecting different communities as *reificative connection*:

Reificative connections can transcend the spatio-temporal limitations inherent in participation. We cannot be all over the world, but we can read the newspaper. We cannot live in the past, but we can wonder at monuments left behind by long-gone practices. In this respect reificative connections afford seemingly limitless possibilities.

However, Wenger notes that accompanied artefacts are more likely to succeed in bridging between CoPs. A person who accompanies and introduces, say, a document into its new social context can help to interpret it and 'negotiate its relevance'. This may be needed because the lessons of one situated experience may not immediately be seen as offering anything to another, or because the methods of analysis used by one community are unfamiliar to another. Different CoPs may describe the same kind of phenomena with different terminologies – or use the same words to mean different things.

The third-millenium repertoire for CoPs

We meet under circumstances in which the landscape of possibilities for participation and reification are changing fast – within communities of practice, between them, and around their peripheries. The standard repertoire of face-to-face meetings, correspondence, telephone calls and printed journals is being supplemented and in some parts replaced with email and email lists, electronic documents, Web sites, on-line forums, virtual meetings and webinars, and electronic social networking tools.

In Wengerian terms, each of these new repertoire items is a reification, a human construct. They are not simply tools, though a technologically-fixated person might consider them so. Consider the telephone, and behind it the telephone system. Yes, these are tools, but when we make a call much else comes into play: the conventions appropriate to calling someone, our expectations about how the other party will respond, the framework paying the cost of a call and so on.

Technological change also changes the human factors and expectations: a phone being cordless changes what people can go and look for while on the phone, mobility of cellphones mean we don't expect people to be 'away from the phone' and VOIP may mean we don't expect people to be deterred from returning our call if it's free to them.

Though they are reifications, what's crucial about Internet-mediated means of getting together is that they are platforms for participation and at the same time many of them are platforms for making and organising new reifications. Also, these tools may themselves be 'boundary objects' or act as the matrix within which boundary objects are created, shared and 'accompanied'.

Whether for communities internal to businesses and organisations, for inter-organisational contacts, for learned and professional societies, for academia or for campaigns and voluntary associations in civil society, these are changes occuring so quickly that they are difficult to digest. There is the risk of responding to them faddishly, without sufficient analysis, and without learning from the experience of others.

Yet paradoxically these new tools offer means of learning from experience, and sharing analyses: in other ways, ways of making and organising knowledge in communities… *about* making and organising knowledge in communities.

To make an analysis of the new repertoire for communities, and to compare it with the traditional repertoire, we need some mental tools.

Deploying the concept of 'affordances'

The concept of 'affordances' was put forward in the 1970s by the cognitive psychologist James J Gibson, author of *The Theory of Affordances* (1997). In a 1971 memo, he expressed it thus: 'Roughly, the affordances of things are what they furnish, for good or ill, that is, what they afford the observer.'[1]

An example might be that a flight of stairs with a rise of 15cm each affords the average human a means of ascending to a higher level; stairs that are 50cm high afford this facility less, but make excellent amphitheatre seating; and neither arrangement is much use to a Dalek. A pencil affords the possibility of erasure and amendment; an indelible pen affords permanent marking.

Within the field of human-computer interaction (HCI), the term is more readily associated with another cognitive psychologist, Donald A Norman, and explained in such works as *The Design of Everyday Things* and *Things That Make Us Smart.*

1. For the text of Gibson's memo, see http://huwi.org/gibson/prelim.php

Norman's emphasis is not so much on what things afford the observer physically, as much as on how the possibilities of interaction and use are perceived: the affordance becomes less a characteristic inherent in the physical object (though physical characteristics are still significant) and more a matter of relationship, what Norman calls an 'ecological approach'.

How can this concept of affordances be deployed to help us analyse the relative effectiveness of our expanding repertoire of means?

Not to spoil our fun (for this is to be the focus of one of our afternoon discussion exercises on 9th October), I shall limit myself to one example: the different affordances of an email discussion list and a Web-based discussion space accessed via a Web browser.

The best way to illustrate affordances is often some sort of narrative, so here goes. Some years ago, when the primary mode of Internet access for the private citizen was 56kbps dial-up, I was a research fellow attached to the University of Reading, but working from home. To co-ordinate activities around the Fabula project, we primarily used emails sent to all participants in our network. (In fact there was no list-server, but the effect was as if we were using one.)

Some of the academics in our team argued that email was a terrible way to progress the project's work:

- the emails arrived when they were doing something else, and interrupted their flow of concentration;

- they were unable to manage the emails pertaining to the Fabula project, because they just arrived in the In folder;

- the discussions contained in the emails were not 'threaded' in a way that they could easily follow;

- Fabula discussions got lost in the huge volumes of email to which they were daily subjected.

They therefore proposed setting up a bulletin board system in which people could post input on topics; there would be a facility to leave a comment in reply; everything would automatically be neatly gathered in one place; and the conversation would not be lost in the maelstrom of email.

Those of us working on dial-up connection from home pointed out:

- it's very irritating, not to say costly, to dial into the Internet several times a day and check the Web site only to find that no extra comments have been added;

- in contrast, the advantage of email is that it simply arrives when you check your other email;

- surely an intelligent person, even an academic, should be able to figure out how to stop email arriving when they are working on something else, set up a Fabula folder and filter the Fabula email automatically into that.

The Web-based system collapsed from lack of use, especially as it transpired that even its advocates with their always-on, free and fast Internet access didn't bother to check the site – but could be provoked into replying to email!

Time and technology have moved on, and these days it could be argued that (a) everyone in such a community has always-on broadband, and (b) the Web site could be configured to provide either an RSS feed or email notification. On the other hand, maybe people's habits haven't changed so much. However, the point of the above narrative was simply to illustrate how the affordances of two alternative mechanisms for participation in community are crucial to an evaluation of their strengths and weaknesses, and of how to build on the strengths, and engineer ways to overcome the weaknesses.

Under the Coasean floor

In closing this review of literature, I shall lift a few points from *Here Comes Everybody: the power of organizing without organizations* by Clay Shirky, published earlier this year. Shirky teaches New Media at New York University, with a focus on interrelationships between the topologies of social networks and networking technologies. His claim (quoting from the book jacket) is that

> *In the same way the printing press amplified the individual mind and the telephone amplified two-way conversation, now a host of new tools, from instant messages and mobile phones to weblogs and wikis, amplify group communication. And because we are natively good at working in groups, this amplification of group effort will change more than business models: it will change society.*

Larger claims aside, a key set of observations by Shirky are based on a critique of the ideas of Ronald Coase, who in 1937 in a paper on *The Nature of the Firm* explained that organisations generally do better than loose coalitions of individuals because formal management of an organisation and the regular decision channels this sets up lowers the 'transaction costs' of doing business. On the other hand, management is a tremendous overhead cost as well. Either way, activities the transaction costs of which outweigh the benefits just won't get done.

However, says Shirky, these new tools such as Facebook groups, wikis, Twitter, Slideshare, blogs, email lists and so on radically collapse transaction costs, such that 'loosely co-ordinated groups can now achieve things that were previously out of reach for any other organizational structure, because they lay under the Coasean floor.' He goes on:

> *Activities hidden beneath that floor are now coming to light… Prior to the current era, the alternative to institutional action was usually no action. Social tools provide a new alternative: action by loosely structured groups, operating without managerial direction and outside the profit motive.*

Shirky explicitly references Seely Brown & Duguid, and Wenger, claiming

> *By lowering transaction costs, social tools provide a platform for communities of practice… Communities of practice are inherently co-operative, and are beautifully supported by social tools, because that is exactly the kind of community whose members can recruit one another or allow themselves to be found by interested searchers.*

(Here I have to point out Shirky's enormous optimism about CoPs, which I have to say is of a piece with his faith in all things decentralised and suspicion of traditional organisation. This contrasts with the more sober assessment of Wenger, who points out that the real life of a community of practice is often riddled with tension and conflict, professional and personal jealousies, backbiting and unresolved disagreement.)

Social Capital

Another concept which Shirky draws on – and it is one which might give us a handle on how to set up and manage social tools for CoPs in ways that will produce happiness, mutual aid and productivity – is that of Social Capital. This term is derived from the work of the sociologist Robert Putnam, and Shirky explains:

> *When your neighbor walks your dog while you are ill, or the guy behind the counter trusts you to pay him next time, social capital is at work. It is **the shadow of the future**[1] on a societal scale. Individuals in groups with more social capital (which is to say, more habits of cooperation) are better off on a large number of metrics…*

Shirky then draws a distinction, within Social Capital, between Bonding Capital and Bridging Capital:

> *Bonding capital is an increase in the depth of connections and trust within a relatively homogeneous group; bridging capital is an increase in connections between relatively heterogeneous groups.*

The somewhat obvious question – and one very much worth debating – is whether the kind of social tools and networks of which Clay Shirky writes can be engineered with affordances that make cooperation natural, and make the emergence of conflict go 'against the grain', so that social capital accumulates easily within the community that the tools maintain. Or is it the case that all such technologies are neutral, and that it is purely how people behave within them that makes online communities thrive or dive? My belief is that both factors are significant and worthy of regard.

Promise, Tool, Bargain

Shirky offers the view that three factors are essential to the success of any voluntarily-assembled group (and naturally, his focus is on online groups).

◆ Firstly, there must be a **promise** which creates a desire to participate, and which generates the expectation that the cost of participating will be repaid in terms of what one gets back out of it. Shirky explores the idea of a 'sweet spot' where participation is neither too mundane nor too challenging.

◆ Secondly, there is the **tool**, and Shirky rejects the idea that there is any generically good social tool. A tool which supports collaborative workflows may, for example, be useless in supporting discussions. 'A good social tool is like a good woodworking tool,' he says. 'It must be designed to fit the job being done, and it must help people do something they actually want to do.' That doesn't preclude a community adopting more than one kind of tool to support different forms of interaction: the Knowledge Management for Development community, for example, has a Web site, an email discussion list and a wiki.

◆ Thirdly, whether it is explicit or implicit or emergent, there is the **bargain** – that which clarifies what you can expect of others in the group, and what they can expect of you. For example, in a wiki, the bargain is that you can edit anyone else's writing, and they can edit yours.

---

1.   My emphasis here – the idea of 'the shadow of the future' is derived from Robert Axelrod's work on The Prisoners' Dilemma

Coda: The philosophy of design for society

The reifications and cultural artefacts embedded in the experiences and practices of communities often evolve as the interplay of many interwoven dynamics, the history of which is difficult to disentangle. However, we can often detect clear moments when tools, artefacts, conventions or institutions are designed or re-designed: when we become aware of a hand on the tiller of history.

Within the philosophy of design as it emerged from roots in the nineteenth century, there are concepts such as fitness for purpose; from the 1970s, the idea that systems might be designed around users' needs emerged; and in the last 20 years, we realised that it is presumptuous and often wrong to extrapolate from our own world-view to a conclusion about the usability of the things we design – they must be tested with representative users.

Even more recently, we have begun to appreciate that when complex systems are being designed for use in social settings, the research methods of the social sciences are relevant even to software and product design: that sympathetic study of the social lives and needs of communities – ideally, involving them in requirements elicitation and in a sense as 'co-designers' – can make the difference between creating tools and institutions that will be embraced and those which will be ignored.

It should be unnecessary to add, but probably for a technically-focused audience it has to be added, that all such decisions have a political effect!

Bibliography

Allee, V.   1997.   *The knowledge evolution. Expanding organizational intelligence.* Boston, MA: Butterworth-Heinemann.

Axelrod, Robert.   1984.   *The Evolution of Co-operation.* Basic Books.

Bruner, Jerome.   1996.   *The Culture of Education.* Cambridge: Harvard University Press.

Coase, Ronald H.   1937.   'The Nature of the Firm' in *Economics* NS4 (16)

Gibson, James J.   1977.   'The Theory of Affordances' in Robert Shaw and John Bransford, eds. *Perceiving, Acting, and Knowing: Towards an Ecological Psychology.* Lawrence Eribaum.

Glazer, R. 1998.   'Measuring the knower: towards a theory of knowledge equity' in *Califormia Management Review*, 40(3).

Hildreth, Paul and **Kimble**, Chris.   2002.   'The Duality of Knowledge' in *Information Research*, Vol. 8 No. 1, Oct 2002. Also see http://informationr.net/ir/8-1/paper142.html

Nonaka, Ikujiro and **Konno**, Noboru.   1998.   'The Concept of *Ba*: Building a Foundation for Knowledge Creation'. In *California Management Review*, Vol. 40 No. 3.

Norman, Donald A. 1990.   *The Design of Everyday Things.* New York: Doubleday. Originally published as *The Psychology of Everyday Things* in 1988. New York: Basic Books.

Norman, Donald A. 1993.   *Things That Make Us Smart: defending human attributes in the age of the machine.* Addison-Wesley.

Orna, Elizabeth. 2004.   *Information Strategy in Practice.* London: Gower.

Orr, Julian. 1966.   *Talking about Machines: An Ethnography of a Modern Job.* Ithaca, NY: IRL Press.

Polonyi, Michael.   1967.   *The Tacit Dimension.* London: Routledge and Kegal Paul.

Putnam, Robert D.   2000.   *Bowling Alone: The Collapse and Revival of American Community.* Simon & Schuster.

Ryle, Gilbert.   1949.   *The Concept of Mind.* London: Hutchinson.

Seely Brown, John and **Duguid**, Paul.   2000.   *The Social Life of Information.* Boston, MA: Harvard Business School Press.

Shirky, Clay.   2008.   *Here Comes Everybody: the power of organizing without organizations.* London: Allen Lane.