Knowledge, Creativity and Innovation

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Creativity and innovation concern the process of creating and applying new knowledge. As such, they are at the very heart of Knowledge Management. Knowledge Management, however, is a new discipline and creativity and innovation need to be thought about in this new context. This paper first creates a framework in which to discuss these issues. It goes on to explore how our creativity is 'blocked' in a variety of ways, including deep-seated beliefs about the world. Finally, this paper takes a brief look at two tools to support Knowledge Management and creativity: one in the human domain – dialogue, and the other in the technology domain – groupware.

INTRODUCTION

If Knowledge Management is to have any real impact on the way we do business, then it has got to be about making radical changes in the way that we utilize knowledge. It needs to be about creating new knowledge, applying knowledge and in the words of Peter Drucker: "Making it productive." In other words, Knowledge Management needs to fundamentally focus on creativity and innovation.

Information and Knowledge

To have a meaningful conversation about knowledge and creativity it is essential to carefully define and agree the words we use. Different people use the same words with subtly different meanings. Many English words in every day use are utilized loosely and ambiguously. If we do not think about their usage we only hinder communication, not enhance it. Defining our words also helps set a conceptual framework in which we can better discuss the issues that face us.

So let's first differentiate between data, information, knowledge and wisdom as the distinctions are often blurred or confused. Although knowledge is often seen as a richer form of information, this differentiation is not terribly helpful. A more useful definition of knowledge is that it is about know-how and know-why.

A simple non-business metaphor is that of a cake. An analysis of its molecular constituents is data – for most purposes not very useful, you may not even be able to tell it were a cake. A list of ingredients is information – more useful. An experienced cook could probably make the cake – the data has been given context. The recipe, though, would be knowledge – written knowledge, explicit knowledge – it tells you how-to make the cake.

On the other hand, an inexperienced cook even with the recipe might not make a very good cake. A cook, however, with relevant knowledge, experience, and skill – knowledge that is not easily written down, tacit knowledge – would almost certainly make an excellent cake from the recipe. Finally, wisdom – well that's about knowing which cake to make! It is about wise judgement.

An important point to note here: to make knowledge productive you need information. Knowing how to make a cake is not sufficient, you need information – the list of ingredients. And to make a wise decision you also need information – the likes and tastes of the consumers of the cake. So knowledge on its own is never good enough. You need information and knowledge and, of course, doing the wrong thing well is also not productive, so you also need wisdom.

Know-why is also important. Let us suppose you are missing a key ingredient of the cake. Knowing why a particular ingredient was part of the recipe might help a knowledgeable cook substitute an alternative. In fact, know-why is often more important than know-how as it allows you to be creative – to fall back on principles – to re-invent your know-how and to invent new know-how.

Competence and Mindset

But there is a factor missing. Explicit knowledge, tacit knowledge, information, experience and skill

are not enough to make knowledge productive. A person putting knowledge into action needs to be competent and that means three essential elements: they must have the knowledge and the skill, but most of all they must have the right motivation and attitude.

You can have the most knowledgeable, skilled people in the world and provide them with perfect knowledge, but they may still fail to do anything useful with it. In other words their mindset is important. Michael Schrage has even gone so far in a recent interview to say that he thinks: "Knowledge Management is a bullshit issue" as "most people in most organizations do not have the ability to act on the knowledge they possess."

Knowledge Management

So let's look at the meaning of Knowledge Management as there are many definitions. A common definition is: "The collection of processes that govern the creation, dissemination and leveraging of knowledge to fulfil organizational objectives."

I feel this definition is inadequate, however, as it limits Knowledge Management to a set of processes. In reality, Knowledge Management applies right across the organization – it is a holistic concept.

I prefer what I feel is a more useful definition. I have adapted it from an original definition by the Gartner Group: "Knowledge Management is an emerging set of organizational design and operational principles, processes, organizational structures, applications and technologies that helps knowledge workers dramatically leverage their creativity and ability to deliver business value."

Although verbose, I feel it puts focus and responsibility on the individual – the knowledge worker – and on the holistic nature of Knowledge Management.

Finally, many people think that the term 'Knowledge Management' is an oxymoron – how can you 'manage' knowledge. Well you clearly can manage some aspects of knowledge. You can manage explicit knowledge captured on paper and in electronic databases in the same way you can manage information.

But where the term 'management' is inappropriate is in its relation to tacit knowledge – the knowledge in people's heads. This is the important stuff. Here Knowledge Management – in its creative sense – is more about nurturing than managing. It is more organic than mechanistic.

Creativity and Innovation

So in this context, what is creativity and what is innovation? There are several definitions. Often they are not distinguished. They are simply seen as part of the process by which knowledge is developed and transformed into business value. This is a perfectly acceptable definition, but again like the failure to differentiate between information and knowledge it is not very useful for the purpose of discussing the subject area.

A more useful approach is to view creativity as the process of generating ideas whilst seeing innovation as the sifting, refining and most critically the implementation of those ideas. Creativity is about divergent thinking. Innovation is about convergent thinking. Put simply, creativity is about the generation of ideas, and innovation is about putting them into action.

Creativity – coming up with new ideas – is not enough. We need innovation – the taking of new or existing ideas and turning them into action. This requires the application of existing knowledge and the development of appropriate new knowledge. Also coming up with new ideas is the food of innovation. Innovation is a far tougher proposition than creativity.

The Nature of Ideas

What is an idea? An idea is simply 'something' that is unrealized, unproven or untested. It can take many subtle forms. It could be an unrealized goal: 'Let's go to Mars'. It could be an unrealized product: 'Let's build a Mars ship'. It could be an unrealized service: 'Let's lay on charter flights to Mars'. It could be an unproven insight into the nature of things: 'Maybe there is a stream of particles flowing out from the sun'. Or it could be a new unproven concept of how something might work based on new knowledge of a natural, social or business phenomenon: 'The solar wind could power the ship'.

The realization of an idea may be vision driven: 'This is our goal. Let's identify and develop new knowledge to achieve it'. For example, 'Let's put a man on the moon by the end of the decade'. Or it may be knowledge driven: 'We have new knowledge. How can we apply it to the development of new products or services?' For example, 'We understand the workings of the atom. Based on this knowledge could we build a nuclear powered electricity generation plant'. Both forms are valid and both are visionary in their own way.

BLOCKS TO CREATIVITY AND INNOVATION

We are all naturally creative and the need to create is a fundamental driving force in human beings. If this is true, why do we not see a more creative world in every sphere of life? Much of it has got to do with our ways of thinking. Sir William Bragg is quoted as saying: "The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them."

I think the same applies to business and our everyday work life. Much of the time we don't need lots of new information or lots of new ideas – what we need is to think about the information and knowledge that we already have in abundance in new ways. But one of the major reasons that we fail to do this is that there are blocks to our creativity, and until these blocks are removed creativity cannot flourish. So let's look at some of these blocks.

Creativity is a Serious Business

Creativity is often thought to be a serious analytical task. This is not true. The starting point of creativity is the generation of new ideas. It is thus important to look at the process by which new ideas are created. New thoughts and ideas come from a kind of thought-play of the mind. Daydreaming of what could or might be. It is a game – a fun game. Playing with words, concepts and metaphors. Playing what-if games. What if this were true? What if things were different? What if this limitation did not hold?

John Kao in his book *Jamming – the Art and Discipline of Business Creativity* introduces the concept of creative 'jamming' based on a musical metaphor. He defines jamming: "To take a theme, a question, a notion, a whim, an idea, pass it around, break it up, put it together, turn it over, run it backward, fly with it as far as possible, out of sight, never retreating ... but yes, here it comes, homing in, changed, new, the essence, like nothing ever before."

This is clearly all about play, all about having fun. It is about not recognizing boundaries or limitations – exploring for its own sake. In play nothing is taken for granted. Nothing is absolute or unalterable. This is the essence of play. Also, playing on your own is usually not much fun. Playing is a team sport, it's about interaction, working together and collaboration.

Creativity is Not Needed

Generating new ideas – being creative – is often thought to be about holding brainstorming sessions or the like, and although such sessions play their part we miss a huge opportunity to be creative if we only view it in that fashion. We actually get to play all of the time or at least we do if we see it that way. Every interaction in our lives should be about play – should be about learning, about creativity.

In my view, the playground is our lives. In business we get to play when we interact with people. If we only took the time, company meetings, so often a bureaucratic waste of time, are one of the best opportunities for play and learning. Working, communicating, co-ordinating and collaborating together on projects with common objectives are the 'swings and roundabouts' of the playground.

In short, when we interact with people we have an opportunity to learn, to influence, to make things happen. We need to be creative every minute of our lives. Every decision, interaction and act needs to be a creative and innovative one – not one out of habit.

Creativity Is Specialized

One of the biggest blocks to creativity at both the individual and organizational levels is the thought that creativity is only needed in specialist disciplines such as R&D. Creativity is needed at every level and every dimension within an organization. Creativity is the responsibility of each functional discipline, each team, each manager and each and every individual. Creativity is not limited to the grand scheme of things – to new products, new services and new and improved processes. If I can better organize my day or write a report in a new or more effective way, then this is every bit a creative act.

Limiting Paradigms

The biggest block to creativity at any level is the paradigm. 'Paradigm' is a much misused, abused and misunderstood word. A paradigm is a whole way of thinking, perceiving, communicating and viewing the world. It is often called a worldview or a mindset. The important point to understand about a paradigm is that it works at the subconscious level. We are not aware of our own paradigms. It's a bit like thinking the whole world is coloured red – not knowing we are wearing rose-tinted contact lenses.

Paradigms include theories, principles, values, beliefs and doctrines. They can be thought of as a rigid tacit infrastructure of ideas that shape not only our thinking, but our whole perception of the world. When someone says, "We need a new paradigm for this," it is a misuse of the word. All

they are saying is 'we need a new approach or we need a new way of looking at things'. By the very definition of the word our personal and organizational paradigms are not known to us.

Paradigms are both good and bad. In one sense they are the mind's immune system against new, possibly dangerous ideas. On the other hand, if they prevent the acceptance of any new idea they are potentially more dangerous. The problem is: we do something (we make a decision) and then we react in a particular way, quite naturally for a subconscious reason. A reason with which our conscious mind would not agree.

However, our conscious mind rationalizes our action. And we move on totally unaware (at best dimly aware) that we have done something for the wrong reason. Some of us may recognize that we do this in our personal lives – in our emotional lives, in our relationships with our loved ones. But we do it too in our business lives.

So paradigms block our creativity. They limit our thoughts and our actions in a way in which we are not aware.

Inappropriate Mental Models

Having looked at paradigms we need to look at the concept of mental models. Mental models and paradigms are closely related. Paradigms are our subconscious models, mental models are conscious (see Figure 1). The best examples of models are scientific models. Scientific models are extremely explicit, often encoded in maths. But we must remember that scientific models are just that – models. They are not reality.
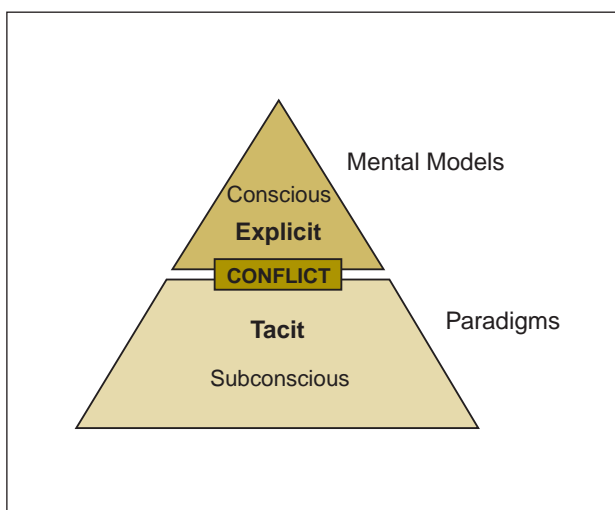

Figure 1: Mental models and paradigms

A model is an approximation to reality. Models only work when certain parameters are fixed or certain influences are ignored. Newton's model of the universe was the best model we had for a long time. Einstein's model has since provided an alternative – one that better explains reality. Neither model is proved or disproved. Although Einstein's model is superior, the Newtonian model is still appropriate to use in many cases – you need not worry about the relativistic shrinking of space and time when travelling in your car down the motorway, for example.

But I'm not just talking about scientific models. I am using them as examples. We have and use many other models of the world in our everyday lives. Examples of business models are how our particular market operates or what makes a good development process. The message is that we too often make the mistake in our thinking that our business models are real – they are not. Models are simply useful tools for understanding the world, making predictions and getting things done. One model is useful in one situation, but an alternative model is more appropriate in a different situation.

We also limit ourselves when applying our mental models. We may have only one or two that we use in a given situation. But in the real world of people and business things are more complex than even the scientific world. Every business is different, every person is different – one model will not do for all. We need a larger set of models or better still in a fast changing world, we need to think things through from first principles each time and appropriately adapt for each new situation.

Limitations of Traditional Teaching

Traditional attitudes to teaching and the everyday communication of ideas and concepts are also another serious limiting mindset.

"We teachers – perhaps all human beings – are in the grip of an astonishing delusion. We think that we can take a picture, a structure, a working model of something, constructed in our minds out of long experience and familiarity, and by turning that model into a string of words, transplant it whole into the mind of someone else. Perhaps once in a thousand times, when the explanation is extraordinary good, and the listener extraordinary experienced and skilful at turning word strings into non-verbal reality, and when the explainer and listener share in common many of the experiences being talked about, the process may work, and some real meaning may be communicated. Most of the time, explaining does not increase understanding, and may even lessen it."

This quote from John Holt's book *How Children Learn* sums things up – we think we can transpose our knowledge from one person to another by traditional methods of teaching and explanation. It's not that these methods do not have a role, but they are no way as nearly as effective as we might imagine. Adults, like children, learn most effectively through play and through experience.

So we have imperfect mental models of the world that we communicate to each other through the imperfect medium of speech, or the written word. And the result is people with different models of reality thinking that they are talking with each other about the same things! We delude and confuse ourselves.

Inappropriate Belief in Absolutes

Having spoken about paradigms, a related issue is: "What is the relationship of our knowledge to reality?" Let's look at the thinking process. Our thought process generates provisional new knowledge. Putting it into action tests this knowledge. In return we obtain new or improved knowledge. Thus, knowledge undergoes a continuous adaptation. It is continual process of change.

Like an organism, knowledge evolves and is not absolute or fixed in any way. What shapes it is its appropriateness. If new knowledge gives an individual or organization a business advantage, then that knowledge will survive, or else it will perish in an analogous fashion to organisms in the environment.

Richard Dawkins coined a word for small pieces of knowledge – the meme. It is a direct analogy to the gene. The gene stores knowledge about an organism in its DNA that is replicated from generation to generation and refined and pruned by the process of natural selection. In the human mind the meme stores knowledge about the 'world' and it is refined and pruned by the process of putting it into action.

A theory, model or way of doing things – in other words our knowledge – can only ever be disproved, it can never be proved in an absolute sense. It can be clearly shown not to work or not to work well, but it is impossible to show that this is the one and only way in which things work. An innovative marketing strategy can be shown not to have worked, but even when it has worked exceptionally well it is impossible to prove that it was the best, the most appropriate solution at the time. There may indeed have been a better one.

Also, in a rapidly changing world what works well at one time, in one context or in one environment may not work well in another. All the time there is room for thought-play, action, learning and improvement in everything that a business does or creates.

Worry and Rewards and Punishment

If you insist that new ideas must have some business relevance or business value before the innovation stage, then this very thought hinders creativity. New ideas come out of freewheeling play. As soon as this play is constrained by goals, by what is or what is not allowable, by rewards and punishments, then the game loses its interest and creativity is stifled. This is one of the major blocks to creativity at both the individual and organizational level. The following two quotes are again from the book *How Children Learn* by John Holt.

> "If we continually try to force a child to do what he is afraid to do, he will become more timid, and will use his brains and energy, not to explore the unknown, but to find ways to avoid the pressures we put on him."

> "Children do not need to be made to learn to be better, told what to do or shown how. If they are given access to enough of the world, they will see clearly enough what things are truly important to themselves and to others, and they will make for themselves a better path into that world than anyone else could make for them."

These quotes not only apply to small children, they apply to adults as well. Trying to force someone to learn, trying to make them more creative or getting them to do things in supposed disciplined ways, will frequently backfire and have the opposite effect.

We are seeped in an educational and business tradition that lays great emphasis on rewards and punishment. Management by objectives, appraisals, remuneration policy and exams are all geared towards the improvement of performance. Research shows that at least in the area of creativity these policies are counter-productive. This is a thorny issue.

Fear and Lack of Truth

Fear is one of the more common blocks on creativity – the fear of 'getting it wrong', 'losing face', 'making a fool of oneself', 'failure'. In our Western culture such fear is crippling enough, but in other cultures it is far worse.

In the Maldives, for example, students are so fearful of 'getting an answer' wrong that they will abandon an evening class if a teacher directs questions at them. Freshly qualified, highly educated teachers will avoid teaching because they fear making a mistake in front of the class. Learning is all about rote remembering as that is one sure way of avoiding mistakes.

These are extremes but how often do we see the shadows of such behaviour in our business lives. It is probably one reason why rewards and punishment do not work well. They instil fear into so many people – fear of failure and fear of punishment.

One answer to all of this is to 'speak the truth'. Not that there is a single *truth*, a single right way of doing anything, but you should never be afraid to make your perception known. In his book *The Circle of Innovation,* Tom Peters makes the point that in his opinion 'telling the truth' is the single most important thing that a leader can do to bring about fundamental change. And, of course, we are all leaders.

Infanticide

The problem with new ideas is that they are by their very nature often ill formed, sketchy and with contradictions. In their nascent state, like a new-born baby, they are extremely vulnerable. They are easy to destroy – they even invite it. But if we killed every new-born baby because they couldn't do much, we would quickly perish. So ideas, like infants, need parents to protect and nurture them and to give them an opportunity to develop.

Information Overload

In the past, lack of information was a bottleneck in business. But today with electronic mail, newswire databases, etc., we have 'information overload'. Information is no longer a bottleneck, it is a liability and it gets in the way. We tend to think that to do anything we need to track down and analyse all the information and explicit knowledge that is available. But the real bottleneck today is 'creative thought'.

Judgement

Judgement is yet another major inhibitor of creativity. We are brought up in a world where judgement is the norm. We are not only quick to judge and criticize others, but have that so-called little 'voice-of-judgement' in our heads – our VOJ – in the words of Michael Ray in his book *Creativity in*

Business that incessantly judges everything we do and holds us in a kind of 'creative straight jacket'. At times when we are being creative we need to learn to withhold our judgement.

REMOVING THE BLOCKS TO CREATIVITY

We have looked at some but certainly not all of the blocks to creativity and innovation. But how do we overcome them? Well, there are many answers – some implicit in the descriptions above, others not. I wish I had more time and space to explore them in detail, but fundamentally I believe there are two dimensions to Knowledge Management and the nurturing of creativity and innovation.

One dimension is clearly the human element and the other is technology. Many people will argue that technology is a useful tool, but has really got nothing to do with any of this. Here I differ. Technology coupled with the human mind creates a synergy that allows us to transcend traditional ways of thinking and working.

It is too easy to dismiss the hype over the technologies of the Internet and the World Wide Web, but like many others I am convinced that these are transformational technologies. I think when we look back from a perspective of history that the hype will be seen to have been underplayed! The human mind and technology are on a rapid co-evolutionary path.

So I would like to very briefly look at two 'tools', one in the human domain and the other in the technological domain: dialogue and groupware respectively.

Dialogue

In my view the real killer of creativity is the stranglehold that our limiting paradigms and mental models exert over us. We are prisoners of our own past – our upbringing, our education and past business experiences. These limit and constrain us in our ability to think and act creatively. But there is an emerging solution and that is the concept of 'dialogue'. Dialogue is a tool that allows us one-on-one and in groups to discuss issues in a way that helps reveal our limiting paradigms and in doing so lifts one of the major blocks to our creativity.

There is a deep fundamental problem in the way we relate to each other and in the way we 'discuss' or 'argue' issues – whether one-to-one, in small groups or in meetings. Let's take a look at what some 'thought leaders' say on this issue. In the words of Stephen Covey we listen "with the intent to reply –

not the intent to understand." Hence Stephen's fifth habit: "Seek first to understand, then to be understood." David Bohm sees discussion as where "people hold relatively fixed positions and argue in favour of their views as they try to convince others to change." Edward de Bono talks about "argument becoming case making, point-scoring and ego-strutting."

The problem is that discussion is too often about 'argument' – about steam rolling something through, about forcing agreement or compromise. It is about confrontation. It has nothing to do with creativity or the exploration of possibilities. In short, our habitual ways of thinking are anti-creational.

It is worse when anything of fundamental significance is at stake. Attitudes harden to the extent that it is extremely difficult to make progress at all. People have hidden agendas, people perceive hidden agendas and discussion can verge on open warfare. Extrovert types do battle, introverts recede into their shells. Such 'discussion' is not creative, it is destructive not only of the 'truth' but worst of all of 'relationships'.

So is there an alternative? Yes. This is where dialogue plays its role. Dialogue is based on the work of David Bohm and I think about to be made immensely popular with the publication of a new book entitled *Dialogue* by Linda Ellinor and Glenna Gerard of the Dialogue Group.

In dialogue you prefer a certain position but do not cling to it. You are ready to listen to others. Your mindset is one not of 'convincing others that your way is right', but of asking what can I learn from others. It is recognizing that their input will help you refine your own ideas or fundamentally point out where you are wrong. It is not a fight. It is not win-loose. In dialogue all sides win by coming up with a more appropriate solution than a single person could ever have. It is win-win.

It is what Stephen Covey calls 'synergy' – and this leads to his sixth habit 'Synergize'. This is what Stephen says about it: "Many people have not really experienced even a moderate degree of synergy in their family life or in other interactions. They've been trained and scripted into defensive and protective communications or into believing that life and other people can't be trusted. This represents one of the great tragedies and wastes in life, because so much potential remains untapped – completely undeveloped and unused. Ineffective people live day after day with unused potential. They experience synergy only in small, peripheral ways in their lives."

So what is synergy? It is where the whole is greater than the sum of the parts. It's in the relationships that exist between the parts. Again in the words of Stephen Covey: "The essence of synergy is to value differences – to respect them, to build on strengths, to compensate for weaknesses." Dialogue and synergy are founded on trust. The more that you trust someone the easier it is to engage in dialogue and the more likely that you will achieve synergy.

We also need to acknowledge facts as they are, whether we like it or not. We tend to avoid and walk around facts that we do not like, for example, if something is just not working we look the other way, we pretend all is OK, we delude ourselves. Don't kid yourselves, we all do it! Dialogue is about suspending your own views – your own judgement temporarily – and focusing on the alternative view point. To let it into your mind rather than close it out, so that it can mingle and merge with your own viewpoint. It's a very different way of thinking to that which we have been educated and accustomed. In summary, dialogue and discussion can be compared as shown in Table 1.

Table 1: Comparison of dialogue and discussion

Dialogue	Discussion
Non-judgemental	Judgemental
Exploring	Confrontation
Win-win	Win-lose
Synergistic	Fragmenting
Inquiring	Defending
Learning	Persuading, telling, selling
Divergent	Convergent
Creative	Destructive
Trust	Cynicism

The real power of dialogue, though, is in revealing our paradigms. As noted earlier, we are not aware of our own paradigms by the very definition of the word. We all, however, have different upbringings, experiences and backgrounds that make us eminently capable of seeing other people's paradigms and they ours. By engaging in dialogue we can reveal other people's paradigms to them and they in turn can reveal ours. This helps us all to see the world in new, more appropriate ways and to destroy a lot of inappropriate assumptions and

misinformation that we all hold dear. In short, I believe dialogue is emerging as an immensely powerful creativity tool and will play a major role in Knowledge Management.

Groupware Technology

John Kao in his book *Jamming* lists a number of reasons why creativity is important today. His very first item declares: "This is the age of creativity because that's where information technology wants us to go next." This may seem a rather strange way of expressing things, but I think that it indicates that he, too, feels the evolution of technology and humankind are intimately interdependent.

He goes on to say: "IT is the medium for representing, organizing and deploying knowledge." And that: "When we add IT to creativity and knowledge, we get a potent combination – capabilities to represent knowledge coupled with technologies to promote collaboration across divergent disciplines and perspectives."

He is clearly talking about 'groupware' technology. One of the pioneers of groupware is Lotus Development. In a white paper, simply called Groupware, Lotus defines groupware as: "tools to enable people to work together through communication, collaboration and co-ordination."

Groupware is coming of age with the advent of I-Net technologies (Internet, intranet and Web technologies) and its groupware – the bringing of people together across time and space – that combined with new ways of thinking is transforming the way that we work.

I believe that groupware development platforms, such as Lotus Notes™ and more recently Lotus Domino™, for intranets and the Web are one of the best kept secrets in the world. Their power is enormous, but still not fully realized or even understood by many organizations. Lotus recently has adopted a strategy of evolving this technology into a Knowledge Management platform – after all the concepts of groupware and Knowledge Management are not so far apart. To provide some idea of its power in relation to Knowledge Management and creativity, let me briefly describe three applications.

1. TeamRoom

The challenge for many companies is to bring employees together across the boundaries of time and geography to brainstorm, share ideas and co-create new products and services. By structuring collaboration to achieve specific objectives or to resolve issues Knowledge Management tools such as Lotus TeamRoom™ drive group interactions beyond the basic interactivity of discussion forums.

TeamRoom is a next generation Web/intranet-based discussion forum from Lotus Development that adds structure and direction to define a shared mission. TeamRoom is also a repository to store common information such as business plans, reports, procedural information and meeting minutes. It can be used for discussions, brainstorming and problem-solving. Used as a planning tool, it aids a team in focusing on critical issues prior to a meeting. It can also be used for task management, such as assigning action items, tracking issues and managing joint work on reports or presentations.

2. LearningSpace

Lotus LearningSpace™ also from Lotus Development is a Web/intranet-based collaborative learning tool. It is for developing, deploying and delivering interactive courses over a network and for augmenting classroom training. LearningSpace course materials include a class schedule, links to readings, and assignments and quizzes.

Learning is more rapid and complete when there is interaction between a student and the instructor and between students themselves. LearningSpace encourages interaction through its facilitation of discussions between each other and with the instructor. Students work in teams and support public and private discussions.

3. Knowledger.PDP

PDP from Knowledge Associates is a Web/intranet-based system for supporting learning, the attainment of key competencies and the sharing of knowledge. PDP allows the identification of people's key competencies and enables their ongoing learning and personal development.

For each competence, individuals can record their current level of performance with their managers or coaches, the level they aspire to and their plans to get there. On an ongoing basis they can then reflect on and enter their daily experiences, skill development and learnings that they feel contribute to an increased competence level. When a competence falls due for review, a history of these learnings is available for discussion with their manager or coach. In an ideal system everyone's learnings are shared in order to maximize the benefits of the system.

CONCLUSION

Creativity and innovation are at the cutting edge of Knowledge Management. We have a long way to go to release our creative energy, both at the personal and organizational levels, as there are many blocks to creativity. One of the key tools to overcoming these blocks is the concept of dialogue. Groupware technology is also evolving into Knowledge Management technology and is playing a major and increasing role.

Our challenge today is to build effective technology-based systems that support us in 'making knowledge productive' and take into account the ways in which we think and behave. ❑

Suggested Reading

This paper was written specifically to explore the issues of Knowledge Management, creativity and innovation. My thinking has been heavily influenced by the sources below and for a broader perspective I would highly recommend them:

Bohm, David and Peat, David F., *Science, Order & Creativity*, Routledge, London, 1989. (A must-read if you are interested in the roots of the concept of dialogue.)

Covey, Stephen, *The Seven Habits of Highly Effective People*, Simon & Schuster, New York, 1989. (A remarkable book about human behaviour and a worldwide best seller.)

Dawkins, Richard, *The Selfish Gene*, Oxford University Press, Oxford, 1976. (Introduction to concept of the 'meme'.)

De Bono, Edward, *I am Right You are Wrong*, Penguin Books, London, 1991. (Excellent book on the limitations of black and white thinking.)

De Bono, Edward, *Six Thinking Hats*, Penguin Books, London, 1990. (The 'Six Thinking Hats' is a powerful group dialogue tool.)

Drucker, Peter F., *Post-Capitalist Society*, Butterworth-Heinemann, Oxford, 1993.

Ellinor, Linda and Gerard, Glenna, *Dialogue*, John Wiley & Sons, Inc., New York, 1998. (A recent powerful description of the concept of dialogue. Also see their Web site: http://www.dialogroup.com/dialogroup.)

Holt, John, *How Children Fail*, Penguin Books, London, 1984. (An intriguing book on the faults of conventional teaching methods.)

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