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How to Overcome the Knowledge Paradox: Activate Knowledge Identity, Not Just Organize Information

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Abstract
A paradox appears to thwart traditional knowledge sharing efforts in organizations: the greater the benefit of a piece of knowledge to an organization the less likely that it will be shared. This paper suggests that in order to mobilize knowledge where there is demand for it, it has to be activated. This paper considers the knowledge identity of the person whose knowledge is to be activated and uses these identities to analyze a case study in which highly distributed knowledge is activated. The analysis reveals activation effects needed to mobilize each of the knowledge identities.

1. Introduction

There is general agreement that to be able to provide customized goods and services, the effective performance and growth of organizations require integrating and sharing highly distributed knowledge [50], [37], [33]. Such knowledge is often personalized and resides in the pockets and communities within the organization. It is also seen to form the core competence of the intelligent enterprise and has to be supported if the organization is to remain competitive [37]. Romer [40] suggests that the value of knowledge sharing is critical to economic success since it is "the only unlimited resource, the one that grows with use."

Efforts to date to harness and exploit this resource through knowledge management have largely concentrated on codifying or explicating knowledge. Infrastructures have been defined for storing explicit knowledge as well as refining, managing and distributing it as stated by authors such as Zack [50], Hansen *et al.* [22]. While these contributions are valuable in themselves, practical considerations such as motivating employees to add to such databases and use them in their "knowledge work" have thwarted the success of many such codification strategies [13]. Ruppel and Harrington [41] suggest that resistance to intranets as a knowledge sharing environment is a management and corporate challenge rather than a technology issue.

This paper suggests that a paradox exists in that the building and sharing of knowledge is one of the highest sources of advantage for an organization, but also the most guarded resource. Thus a core challenge for effective knowledge management is to resolve the paradox. Two of the most frequent explanations of these barriers are (1) the lack of incentives to share knowledge and often strong reasons to protect and hoard it [24] and (2) the lack of mechanisms to make it easy to organize and access knowledge resources [3], [41]. Bechky suggests that since certain articulations of knowledge could potentially signify multiple contents, an expression could mean something different to the receiver than it does to the communicator [3]. Furthermore, occupational communities within organizations can be expected to have different domains of knowledge that are dispersed across many different individuals.

A major challenge remains one of harnessing the power of these "knowledge" networks of distributed knowledge [12], [36]. The challenge is deep-rooted, dating back to Barnard's conception of the organization as driven by the need to build and share intelligence [2], with a long tradition of research on organizational learning [1], [44], and intellectual capital [46]. By leveraging the creation and use of this key resource, new levels of organizational effectiveness can be attained [33], [15], [37]. The need is to mobilize this hidden manpower [19]. There is a recognition that electronic collaboration has the potential to leverage this key resource [43], [31]. However, it is as yet unclear as to how electronic collaboration can leverage knowledge resources.

This paper develops a theoretical framework for the activation of knowledge. This framework suggests that activating personalized knowledge is firstly about identifying knowledge as part of the person, secondly it requires the existence of multiple activation networks and thirdly it depends on creating spaces through which knowledge can be activated. A case study of a multinational organization is conducted that reveals certain

"activation effects" that are needed to activate knowledge. The results and analysis suggest a noteworthy role for electronic collaboration in helping end the knowledge paradox.

2. A Framework for Knowledge Activation

Historically, knowledge has been the essence of much philosophical debate. Initially the process of knowledge creation was seen to be 1) through the logical thinking of rationalism and 2) sensory experience or empiricism. The rationalist view of knowledge, which stems from the earliest philosophers, is based upon the axiomatic belief that there is an objective reality not dependent upon our senses. Rationalists such as Plato claim that there is a perfect world of objects and ideas. Empiricists such as Descartes and Locke argue that knowledge is acquired through the senses as stimuli coming from the external world impinge on our senses and are transformed into sense-data or sensations or perceptions. After many stimuli are thus received, we discover similarities in our sense material. This enables repetition and through repetition we arrive at generalizations or rules, and so we are led by habit to expect regularities.
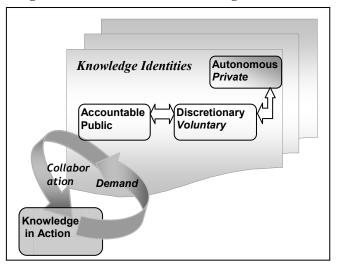
Hegel's (in Churchman [8]) inquiring system makes a distinction between subjective, personal knowledge and the more objective community knowledge. This subjective knowledge results in conflicting interpretations of observations. The phenomenological tradition arose to describe the creation of subjective knowledge as the result of reflection and purposeful action [23], [42]. Together these insights suggest that the creation of knowledge is seen to have internal, psychological, subjective components related to thought processes or acts of thinking and more external and logical objective components related to the world outside the thinker.

Knowledge activation is the conversion of knowledge into action. Activating knowledge is about mobilizing the different components of knowledge by bringing together people with relevant knowledge and using it effectively through their willingness to provide, access and share it as and when needed. Activation, explains Galaskeiwicz [21], comes from being at the centre of resource networks. This gave people in the organisations that he studied, access to a greater number of other organisations that could provide them with the needed knowledge. Because the likelihood of mobilizing such resources is much greater for actors in the centre of social networks, they could more confidently engage the political process - the process of influencing other actors and mobilizing capabilities for collaborative initiatives. In addition, Knoke and Kulksinki [29] found that by cultivating diversified ties to large numbers of community organisations capable of supplying resources, a group's dependence on a single source can be significantly reduced.

This suggests that activating knowledge can reduce an organization's dependence on a single set of experts or extend the organization's access to expertise from other organizations or communities. In this sense it is useful to visualize organizations as Lockean inquiring systems [8]. Courtney *et al.* [9] suggest that inquiring organizations are learning organizations modeled on the theories of inquiring systems. They add that collective action in organizations needs to be based on valid knowledge. However, while an inquiring organization should ensure that its actions are based on valid knowledge, in many cases, the only reasonable guarantor is a Lockean type of consensus among its members [9]. Interaction among individuals that are open to and may be influenced by external information brings about shared understanding. This shared meaning may lead to consensus and collective purposeful action. While these views do not make the identity of the individual explicit, they suggest that knowledge is perceptual and is created through the individual.

This paper takes this concept a step further and suggests that learning is shaped by individual knowledge identities: these may be accountable and part of individuals' professional life, or discretionary that is theirs to share voluntarily, or autonomous knowledge that forms their private experience. The following Figure 1, illustrates the theoretical framework of Knowledge Activation that we investigate in this paper.

Figure 1: Framework of Knowledge Activation

Knowledge is activated through networks of people. Knowledge produced by individuals is used when it becomes exchanged and accepted by others. This is *knowledge in action*. Knowledge in action is determined by the knowledge identities of individuals and the network in which their knowledge – tacit or explicit is activated. In order to activate knowledge, there has to be a demand for it in the form of a request placed within an activation network. Once demand for action has been communicated, collaboration activates the knowledge identities needed for knowledge to be used in action. The three types of knowledge identities can be activated through collaboration.

Accountable Knowledge is knowledge that is part of the public identity and responsibility of an individual, group or profession. Professionals are accountable for the building, use and sharing of knowledge, either as part of their professional identity or their formal position and role in the organization. Accountable knowledge is both role and domain-specific: A CPA, professor, or sales manager is accountable to the communities who recognize and draw on their public identity. Theories of organizational learning suggest various ways in which this knowledge identity may be enacted. According to Duncan and Weiss [16] organizational learning consists of producing communicable, consensual and integrated knowledge. Organizational learning is often seen as an emergent, holistic process of sensemaking through the creation of mental models [44], [48] or a distinct dynamic spiral [1]. This builds upon Daft and Weick's model of organizations as interpretation systems. Duncan and Weiss suggest that although the individual is the only entity in the organization that can learn, this must be viewed as part of a system of learning with exchanges of what is learned among individuals [16].

Discretionary Knowledge is considered a gift to be presented voluntarily as there is no accountable responsibility to share it. The individual announces a willingness to do so and thus opens up his or her private identity and makes the knowledge part of public identity. The decision to contribute to a virtual community requiring discretionary knowledge is voluntary. It is activated through activation networks as they emerge through communities of practice [49], [30], industrial networks [21], and social relationships [48] through which Lockean inquiring systems where knowledge, expertise and experiences are activated as and when needed [10].

Autonomous Knowledge is part of an individual's private identity and is not naturally shared. This knowledge is often both tacit and experiential and a decision to share it is highly personal. As it is core to one's sense of self and not easily recognized, it is depicted on the outer edge of figure 1. It is mobilized – made active – in personal relationships, including friendships and mentoring, and in particular types of communities. The role of meaning, particularly the creation of shared meaning through communication of autonomous knowledge takes us a long way towards understanding the translation of knowledge to purposeful action – hence activation. Theories of changing perceptions of stimuli [11] and theories of personal knowledge creation [33] based upon tacit and explicit knowledge address the processes of how to elicit this type of knowledge [34]. In addition, Boisot [5] suggests that there are multiple dimensions of such personal knowledge.

Collaboration is purposeful joint action through the construction of relevant meanings that are shared by members. Collaboration is needed to 1) determine what action is required and is relevant, 2) identify what knowledge is required to carry out the required action and 3) initiate demand for action. Together, these three aspects enable activation or the use of knowledge to create a joint product or service. In order for collaboration to take place, relevant knowledge must be communicated by members who take part in the networks. In order to support communication it is necessary not only to have proper media with which to communicate, but also a social network or "community of minds" whose members know one another and speak the same language [10]. Holsapple and Whinston [25] add that as organizations will be increasingly regarded as joint human-computer knowledge processing systems, they will be viewed as societies of knowledge workers who are interconnected by computerized infrastructures.

Demand for action is the trigger that brings about the activation of knowledge. Activation of knowledge on demand depends upon the power of a particular request. Acquiring power through corporate networks is very much akin to Kanter's studies [28] that illustrate how mobility of certain individuals between parts of organisations and to other organisations serves as a mechanism for building up the power of certain groups and individuals. Elements of cohesion within a network relative to that of another may provide an indication of the extent to which power and control are potentially exercised over the collective resources of a particular network. Sometimes, looking at the positions on the network may provide an indication of the type and level of authority that actors occupying certain positions possess. This suggests that demand for action has to be coupled with the authority to initiate activation or a legitimacy recognized by other members in the network.

In the following sections, an interpretive approach is used to investigate this framework of knowledge activation. Within this approach, a case study is conducted to examine the above knowledge identities and the ways in which knowledge is activated. Data is collected in a multinational organization that relies on the knowledge of its employees to produce customized services for its customers. This data is analyzed using grounded theory techniques to uncover concepts within the three categories of knowledge identity.

3. Research Approach

Case study research was carried out to enable theory to be further developed through a process of disciplined imagination or sensemaking [48]. A grounded theory approach was used for the discovery of theory from data systematically gathered and analyzed from the research process [47]. The data collected in this case study was analyzed using the concepts of knowledge activation to categorize the data. Theory generated from data can usually not be completely refuted by more data or replaced by an alternate theory.

Theoretical sampling was used to collect, code and analyze the data. On this basis, the researcher decided what data to collect next and where to find it in order to develop the theory further. Data was gathered through interviews, observations and electronic transcripts of newsgroup and community interaction. This data were coded using open

coding and categorized according to conceptual categories. Conceptual categories and their properties were identified in the interviews and transcripts of electronic collaboration. During open coding, data are broken down into discrete parts, closely examined and compared for similarities and differences. Events, happenings, actions and interactions that are found to be conceptually similar in nature or related in meaning are grouped under more abstract concepts. In the following case study, the conceptual properties of activation are discovered and then relations between these concepts sought.

4. Case Study of Galaxy Corporation

The case chosen to investigate knowledge activation is a multi-national information technology and business services organization that is the result of a merger. In order to protect its privacy, we call this merged company, Galaxy Corporation. Galaxy Corporation, has a significant presence in 20 countries in Europe, the USA and in Asia. The Galaxy Corporation Group businesses are diverse and include management consulting, information technology consulting, systems integration, to software development, outsourcing and training. By June of 2001 the Group had close to 60,000 employees across the world.

The concept of an intelligent enterprise rings true to Galaxy Corporation as it provides customized services by selling the skills, experience and intellects of its key professionals. This case is particularly appropriate for a study of knowledge activation through the use of electronic collaboration because an elaborate suite of collaborative technologies has been made available on the company's intranet for the purpose of sharing knowledge. The information and communication facilities available on Starnet's CapCom intranet are the Knowledgebank, which is a database of documents and other information, email, newsgroups and homepages relating to various functions, units and training programs. This is not a standard intranet application as more sophisticated tools are available, such as the Knowledge Marketplace, Virtual Rooms, and My Galaxy. In addition, Sibylle is a natural language query tool available to all Galaxy Corporation consultants.

5. Results and Analysis

The results are derived from data collected just prior to and after the merger of Galaxy Corporation. The data comprise open interviews, observations, and transcripts of electronic collaboration using the corporation's intranet-based knowledge management system. This data are analyzed using the theoretical framework of knowledge activation presented above. In addition to our data, this analysis also draws upon the results of a usability survey conducted prior to the merger with Global Consultancy, that evaluates employee satisfaction with respect to information provision and the communication and collaboration facilities available through the intranet.

The data was organized into conceptual categories and further refined using open coding. These categories were *shared spaces* and *support* for activating accountable knowledge, *reciprocity* and *relationship* for activating discretionary knowledge, and *trust* and *personalization* for activating autonomous knowledge. In some interactions, people meet electronically and then continue interactions through a face-to-face or telephone communication. The following sections distil these results from our analysis and apply the knowledge activation concepts.

5.1 Activation of Accountable Knowledge

Accountable knowledge is activated whenever there is demand for action. Consultants within Galaxy Corporation must develop and deliver customized solutions for clients problems. The development of these takes place in teams with members from different disciplines that bring to bear their experiential and explicit knowledge for which they are accountable. Such teams often include people from the client organization. In order to customize their products and solutions, the consultants of Galaxy Corporation must be able to work with each other as well as with the employees of their clients. This is consistent with Ruppel and Harrington's [41] findings that suggest that organizational culture and work practices are a factor in the adoption and implementation of intranets. The advantage of using such network technologies is that they allow new knowledge to be combined with existing information to generate and systematize knowledge throughout the organization [33].

Within My Galaxy is the Virtual Project Room. This is a tool for electronic collaboration that enables accountable knowledge to be activated every time there is demand for action. The following example illustrates this: Alan is working in a project for a client organization. There is demand for his action as software developed within this project will be used in five other organizations also involved in this project. The project members from Galaxy Corporation are working from several different places and hold information and knowledge relevant and critical to the success of this project. Their knowledge needs to be activated through communication and collaboration. Figure 2 illustrates how accountable knowledge is activated by Alan who is working at home using the Virtual Project Room.

Information on projects and status is shared in the space provided by the Virtual Project Room. Consultants and the members of Galaxy Corporation's client organization can use different levels of functionality within the Virtual Project site. The project manager or consultant responsible for the project ensures that all the necessary information is visible at the top project level. In order to activate accountable knowledge so that it may be used in action, certain "activation effects" need to be in place. Activation effects are the enablers of that ensure the existence of shared spaces and support to them, as described in the following sections.

Alan is working at home today because he has to write a final report. When he starts in the morning he logs in at his Virtual Project Room to check the latest news and download a draft of the final report he started on yesterday. He finds the latest news on the program dashboard and finds his document in the developing work stream. He downloads the document on which his colleagues have been working and begins finalizing it. At the beginning of the afternoon he has some queries about the data in the report and he posts these in a note on his work stream. Within half an hour one of his colleagues responds with a review of the data in a new note. Alan does not understand the review and starts a NetMeeting session with this colleague. On-line the consultants discuss the data, the review and come to a solution. At the end of the afternoon Alan puts the finalized document back in the virtual office so that the other members of the project can read and review the document. It is especially important that the project members who are part of the client organization read it. In this way, Alan feels that he has been able to work more effectively at a distance.

Figure 2: Activation of Accountable Knowledge

Shared Spaces In order to activate accountable knowledge, shared spaces are needed through which different project members can communicate and create shared understanding. Virtual Office (VO) is an electronic shared space used by Galaxy Corporation professionals who work on large projects that span a number of different sites. VO is a web-enabled communication tool accessible at the project level and is combined with My Galaxy. The VO contains several levels of information relating to the project(s) being undertaken, work-packages or work-streams, and personal information relating to participants within projects. A special project administrator compiles a list of members on the project. These may be Galaxy Corporation professionals and members of the Galaxy Corporation's client organizations. They all receive an identification and a password in order to access this facility through the intranet and to post information. Such shared spaces form the boundary objects that mediate cultural differences between the consultants: the English consultants work very differently than the Dutch, and the French consultants have certain characteristics to be taken into account. Qureshi *et al.* [38] found that such electronic spaces enable the accommodation of different perspectives to take place. This is consistent with Inkpen and Dinur's [26] findings that intranets facilitate communication and interaction and create a *knowledge connection*.

Support A person's accountable knowledge can be activated by a number of different people or organizations demanding action. The exchange of information and social support took place through the newsgroups, among other face-to-face and phone interactions. However, the newsgroups were used by only 44.6% of the respondents to communicate needs and share information. According to the usability survey, 78% of the respondents said they preferred to search for the information that they need (using Sibylle) and read the newspages/newsfeeds. This suggests that updating accountable knowledge had high priority. The electronic news desk, the FTP site and the division and unit pages rate higher (average 6.8 out of 10) than the other

information and communication tools. Accountable knowledge is kept current through several information ordering tools known as news, notes, files/documents, events, activity/to do list and forums. These findings are consistent with El-Shinnawy and Markus [17] who found that media features of functionality, usability and ease of use had a major influence on media choice. Blanchard and Markus [4] suggest a feeling of belonging is important in a virtual community. They found that while support was an important part of the community, it was informational and not social (and emotional) support that was considered most important. It appears that it is informational support that enables accountable knowledge to remain updated.

5.2 Activation of Discretionary Knowledge
When accountable knowledge is not sufficient to satisfy a demand for action, discretionary knowledge is activated. This is why the division and unit homepages are more often accessed in comparison to the other facilities. According to a survey carried out of Starnet's employees, 70% of the respondents use the homepages frequently and 61.5% use email frequently. 44.6% use the newsgroups frequently and only 19.8% used the Knowledgebank frequently. Only 10% of the employees stated that they had trouble sharing knowledge. The rest did so regularly in various ways. One popular site for sharing knowledge was the Knowledge Marketplace where consultants would put up a question relating to a specific problem they experienced in the project that they were working on. Often the answer to such problems lies in experiential, and personalized knowledge held by various members of the organization, but not necessarily related to their job description.

The Knowledge Marketplace contained spaces marked by icons that looked like stalls. Each stall was facilitated by one or two consultants in their area of interest but not necessarily expertise. An example of such a stall was "data dictionaries". As expertise was not evenly distributed, people needed to tap into each other's knowledge across the organization. While the existence of this social network was known, it was not clear who should be contacted for particular questions not answered through known experts. The Knowledge Marketplace harnessed the social network and enabled it to be activated. This tool mediated the knowledge sharing activities by connecting people with their world of objects/expertise and also with other people [45], [18]. A shared vocabulary emerged on this tool, and interaction was mediated through a set of norms and rules.

Activation of discretionary knowledge through the Knowledge Marketplace took place as consultants would post questions specific to the topic of the stall. The answer would be given by any consultant, who was able to provide an answer to the question, at his or her own discretion. When someone posted a question or an answer was put on the market spot, the consultant whose market spot had been queried then received an email notification. An example is Martin, a Galaxy consultant, who working at a client site and looking for a search engine for locating directories and

CD Roms for special documents. He logs in through the Internet to the Galaxy Corporation's Knowledge Marketplace and asks his question. Figure 3 illustrates how the Knowledge Marketplace is thus used to activate discretionary knowledge.

Martin: "I am looking for a standard software component with which you can search through documents with several formats (Word, Powerpoint, etc.). The documents are on a CD Rom so the search engine must be server independent. It must be simple and straightforward."

Alan: "You can use Alta Vista, freeware for searching and indexing documents. Works specially for Word and Powerpoint. Within our group we have very good experience with the tool."

Peter: "You can use MS Index Server for building an automatic index"

Janis: "MS Index Server does not work with cd-rom. You have to think about ActiveX control as a plug in , in your browser for making an index. That is a lot of work. Other possibilities you find on www.progressivelogic.se, www.netresults-search.com or www.astaware.com."

Sandra: "MS Index server can not be used with cd-rom. Another solution is verity, but that is very expensive. "

Figure 3: Activation of Discretionary Knowledge

As a result of the above interaction on the Knowledge Marketplace, Martin decides to contact Janis by telephone. They discuss the matter, the options available to him and possible courses of action he can take. In the end Martin is able to follow an informed course of action based on his assessment of the information exchange that has taken place. The activation effects that were identified from such interactions on the Knowledge Marketplace are discussed in the following sections.

Reciprocity Participants who had received answers to their queries through the knowledge marketplace were expected to reciprocate when they had answers to or knew how to arrive at answers to questions posted on the market spot from which they had received assistance. The knowledge market place was seen to be a serious space on which no idle chats were allowed. The shared spaces on the knowledge market place were divided into consultant-defined subjects termed   "market spots." A consultant known as the "midwife" was the facilitator responsible for managing their assigned market spot or "the maternity ward." This facilitator was responsible for ensuring that the resource was used to share relevant information.

The patterns of interaction on the knowledge marketplace are consistent with Burgoon *et al.* [7] who concluded that successful outcomes in computer mediated group communication were related to higher levels of interactivity. They found processes of mutuality and involvement to be significant in effecting task outcomes. Partners perceived as more involved were judged as more credible and attractive to work with. Mutuality was also positively associated with credibility and attraction. The

more that participants felt that their partners were similar to them, the more they rated the partner as reliable, useful, friendly, dominant, trustworthy and attractive to work with [7]. This suggests that in order to activate discretionary knowledge, reciprocal collaborative relationships need to be facilitated by fostering involvement and mutuality. In addition, virtual teams benefit from the presence of caretakers whose sole contribution is to support regular, detailed and prompt communication, as well as to identify individual role relationship and responsibilities [35].

Relationship There was a marked extent to which the creation of relationships among participants had become an integral part of the practice. The activation network was particularly powerful: consultants from very different parts of Galaxy corporation found out about each other through interacting on the Knowledge Marketplace. As a result, they could work together on projects that they would otherwise have not been able to share in. The activation network that developed as a result of interactions using the collaborative technologies has meant that consultants had free access to each others' expertise. They were no longer bound by organizational walls (departments, divisions) nor restricted to working on projects that fell within their own departments. As the identities of the participants in the Knowledge Marketplace were defined by their action, short biodatas of the facilitators of each stall were described in each market spot. In the case of an intranet site on which very diverse members of an organization interact on specific issues, it appears that relationships are built upon the activation of discretionary knowledge.

The consultants who shared their experiential and often tacit knowledge at their discretion with strangers within their organization tended to also meet up with each other in a café or over the phone, hence developing new relationships. Powell *et al.* [35] suggest that if it is feasible for members to meet physically, these interactions should focus on relationship building. Otherwise facilitating socialization through chat sessions or increased social communication can also stimulate relationship building [35]. Robey *et al.* [39] found that electronic communication improved social and emotional relations among workers in remote locations. They even found that a degree of intimacy was achieved with remote communication that spanned functional, geographic and cultural divides. It appears that even though relationships tend to develop through the initial activation of discretionary during electronic collaboration, activation of discretionary also knowledge requires the existence of more ongoing relationships.

5.3 Activation of Autonomous Knowledge

Working with clients requires a great deal of personal input. In order to contribute effectively to their clients, consultants need to draw upon their personal experiences often delving into their private identities. The key mediating tools for activating autonomous knowledge were email, mobile phone and the newsgroups on the intranet.

Collaboration with clients was seen to be a legitimate way of working while the extent to which there was collaboration among employees varied between units. From the transcripts of interactions in the Newsgroups, it is clear that a repertoire of technical jargon used in the consultants' work environments was also being used in the electronic spaces. Shared communication was mostly related to software and technical system development issues. In this process, private autonomous knowledge was brought into the collaborative arena. The use of collaborative technologies did enable conversations with new kinds of properties to emerge [43]. Ideas that would have remained part of an individual's personal repertoire of knowledge, became both external and manipulatable. People were able create icons and textual imagery to represent ideas and concepts which others could modify or manipulate until they become both community property and a visual part of the conversation.

According to Blanchard and Markus [4], the affective bonds that differentiate between neighborhoods and true communities is "sense of community". In their study of a virtual community, They found three processes by which this sense was reinforced: 1) exchange of information and socio-emotional support, 2) creating identities for themselves and creating identifications of others and 3) the production of trust. This suggests that activating autonomous knowledge depends on creating a sense of community, as illustrated in Figure 4.

JM: Who can help me find a product comparison of UML Modeling tools?

WL: Have you looked on the Gartner Group (www.gartner.com ?) site and searched Sibylle ?

PH: Some good alternatives are GDPro reviewed by SD Magazine.
http://www.sdmagazine.com/articles/2000/0002/0002j/0002j.htm
Or TogetherJ, which you can try at:
http://www.togethersoft.com/together/togetherJ.html

DS: Has anyone got templates of procedure handbooks for the management of Intranet content (BBCM)? Any information on the set up and management of content ?

EL: At Warp11 we are busy putting together a handbook. Come and see us at our office and you can browse through a draft version.

Figure 4: Activating Autonomous Knowledge

Activating autonomous knowledge in the newsgroups was achieved by posting questions in exchange for information or support. Identities emerged through interactions on the newsgroups. Given the growing amount of personal knowledge that was being exchanged, it appears that trust was in the making. Such virtual interactions have expanded to off-line interactions and have become part of the life of the community. The activation

effects identified for contributing and sharing autonomous knowledge are discussed in the following sections.

Trust Community members expose their personal feelings and share private knowledge if they trust other members of their community. The collaborative technologies were set up to support that principle by stimulating two- way rather than top-down communication. However, according to the survey results only 25% of the employees felt that through My Galaxy they are "masters of their own destiny". Although the organizational culture at Galaxy Corporation is open, consultants do like to keep important knowledge and information to themselves. The reason for this is if particular business development or information system development techniques are made available electronically, there is a concern about how they will be used. The integrity of information and its appropriate use by other consultants are seen to be very important to the individuals. It has been suggested that high levels of trust and cohesiveness reduce barriers to communication in virtual teams and are instrumental in promoting cooperation [35], [27]. Perceptions of members' benevolence and integrity are core to the development and maintenance of trust [27]. It follows that the perception of trust has an important effect in activating autonomous knowledge.

Personalization Flexibility in the use of collaborative and information technologies to personalize individual work environments is also important, not only for activating autonomous knowledge but for bringing it into the collaborative arena. Because of the merger, Galaxy Corporation's accepted work practices were in a state of dynamic redefinition. Collaboration through discussion groups, face-to-face team working and even simple telephone conversations were seen to be paramount. Individual consultants would personalize a project site for themselves where they put personal activities, files, their own address book, and links to sites and newsgroups that they used. In this way, all project members were able to manage their own projects and could still be part of several projects. Different consultants worked in one or several work streams at the same time, and had access to the work streams in which they participated and to all the related information modules, contained in files, notes, and news for their own stream. They would activate each others' knowledge and develop it by using various discussion tools and email. In building upon each other's ideas, consultants were able to be more creative and apply themselves to more innovative types of projects.

Such situated learning or learning by doing takes place in communities of practice where a sense of belonging and common interests have developed over time [30]. According to Morrison *et al.* [32], community that develops its own organizational memory serves the organization by encouraging learning and creativity, without stifling emergent ideas. This suggests that personalized work environments are conducive to the activation of

autonomous knowledge as they enable knowledge to be channeled towards more creative and innovative projects.

6. Implications for Practice: Overcoming the Knowledge Paradox

From the above analysis it appears that electronic collaboration has a *mediating effect* in the activation of knowledge. Collaborative technologies mediate activities carried out by different people with different levels of expertise and understanding who work in very different contexts. The process of collaborating electronically spans multiple boundaries according to Engeström *et al.* [18] and activities according to Sherry and Myers [45]. The use of electronic collaboration technologies has made it possible in this study to harness intellectual resources across space and time. Yet the technology is only a part of the development and maintenance of the activation networks. These powerful networks are social and community based. As stated by one consultant "You cannot do everything through this contraption [My Galaxy and the Virtual Project Room] !!". Consultants feel that even though they may not rely on the collaborative technologies, electronic collaboration has meant that they can move through the organization more freely and innovative hybrid projects have become more commonplace. We know that the role of electronic communications to leverage networks of people in decision-making and innovation is a growing theme in research [20], [14], [36] and practice [31], [15]. We have found as a result of this research that electronic collaboration mediates the activation of knowledge identities. This is illustrated in the following Figure 5:

Figure 5: Effects by which Knowledge is Activated

Knowledge Identities →	Activation Effects →	Technology Mediators →	Knowledge In Action
Accountable *Public*	Shared Spaces Support	*Virtual Office Newsfeeds/ Sybill*	Product Development
Discretionary *Voluntary*	Reciprocity Relationship	*Marketplace Email/ Homepages*	Problem Solving
Autonomous *Private*	Trust Personalization	*Newsgroup Email/Phone*	Innovation

The case studied in this paper illustrates that the activation of knowledge identities and their appropriate activation effects, the knowledge paradox can be overcome. In this, the role of electronic collaboration is to bridge boundaries through mediating collaborative technologies. For accountable knowledge to be exchanged, the meanings have to be the same in the minds of the receiver and communicator. Shared spaces that enable different perceptions of meaning to be exchanged are required. Electronic collaboration technologies such as the Virtual Office provides the spaces upon which shared understanding can develop and accountable knowledge activated on demand. But it is information support provided by the electronic media that enables accountable knowledge to remain updated. Once activated through these effects that are mediated by the Virtual Office suite, news feeds and intelligent searches, accountable knowledge is best suited to actions in which the deliverables are distinct, such as the development of products.

Discretionary knowledge is exchanged and activated through voluntary participation. The activation effects needed to activate discretionary knowledge are reciprocity in interactions mediated not only through technology but also a facilitator who sets and moderates rules of engagement. Collaborative tools for reciprocity are those that develop interactivity by fostering involvement and mutuality such as the Knowledge Marketplace described in this paper. The emergence of relationships through electronic collaboration appears to be a natural outcome of the activation of discretionary knowledge. Yet the activation of discretionary knowledge also requires explicit attention to relationship building for it to be successful.

The discussion boards on the Knowledge Marketplace and homepages can enable relationships to build on the identification of individual interests. Discretionary knowledge appears to best serve action where multiple alternatives are discussed in problem solving situations. The interactions based on the exchange of discretionary knowledge appear to be imbedded in practice. Key characteristics of discretionary knowledge are that it is activated through a collective process of collaboration, interactions are focused on work related issues and the results of the interaction are manifest in actions and/or products. Discretionary knowledge may be activated through what Brown and Duguid [6] call work-related communities or, in Lave and Wenger's [30] term, community of practice.

Autonomous knowledge forms the private and personal identity of an individual. The activation effects for bringing autonomous knowledge into action are the existence of trust whereby the risk of sharing aspects of one's private identity with the community is minimized. The flexibility with which collaborative technologies may be used to share aspects of an individual's personal identity affects the extent to which autonomous knowledge can be activated. It appears that the personalization of work environments and the flexibility with which collaborative technologies support this, enable autonomous knowledge to be activated in creative interactions. Together with the learning that may take place in communities, these activation effects suggest that autonomous knowledge is particularly valuable in hybrid projects that entail innovation. Key characteristics of the sharing of autonomous knowledge are that it is personal, consensual, based on long term group membership and is community property. As autonomous knowledge develops through interaction within the community, it cannot be traced to one individual and is thus

difficult to activate. However, when activated, autonomous knowledge can become a power to contend with as it resides in coalitions, influences customs, traditions and acceptable norms of behavior. Courtney *et al.* [9] suggest that shared vision and agreement on current reality are necessary ingredients for creative tension in Lockean inquiring systems. Autonomous knowledge can be seen to form, what Churchman [8] terms the "collective mind" which is developed through interpretation, communication, and shared meanings (cited in Courtney [10]).

7. Conclusion

This research defines and develops a theoretical framework of knowledge activation. This adds to the knowledge management literature by developing a notion of knowledge-as-identity that is brought into action through activation effects. The mediating role of electronic collaboration in activating knowledge is an important one. The analysis of the case studied in this paper suggests that by mediating the activation effects needed to bring knowledge into action, electronic collaboration enables the knowledge paradox to be overcome. By mediating the existence of shared spaces and information support, electronic collaboration enables accountable knowledge to be activated. By capturing communities of practice in which reciprocity and relationships develop, electronic collaboration enables discretionary knowledge to be activated. Electronic collaboration may also enable the personalization of work environments and the maintenance of trust. When the activation effects are in place, autonomous knowledge can be brought into action in creative hybrid projects. This perspective of electronic collaboration has implications for the activation of dispersed knowledge for the creation of customised, goods and services. Collaborative technology support must match the activation effects if it is to mediate the activation of knowledge into action.

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