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The Networking Knowledge Worker, Technology Appropriation and the Shaping of Learning Practices

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Abstract

This article reports on an ethnographic study performed in a large and distributed, knowledge intensive ICT company. It gives an in-depth account of the introduction of virtual communities in this organization and what happened afterwards. When confronted with organizational change ideas such as virtual community, people make sense of and appropriate these ideas to make them *â* their own.â We delve deeply into the arguments and motives behind the appropriations of the companyâ s employees, which results into four generalized appropriation patterns. These appropriations patterns indicate that people respond to change ideas by comparing the behavioral norms and essences of professional selves prescribed in these ideas with how they naturally engage in practices of social networking, learning, and professional identity construction. This behavior not only explains their degrees of participation and nonparticipation in the virtual communities created, but it also reveals how employees shape their work and learning practices.

Keywords: Knowledge, Learning

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The Networking Knowledge Worker, Technology Appropriation and the Shaping of Learning Practices

1. Introduction

Much research in the field of organizational learning and knowledge management can be typified as model-theoretic approaches. Based on literature reviews, researchers develop theoretic models that are subsequently often verified by means of case studies or surveys. Aiming at normative implications for practice, such approaches mostly take the organization and sometimes a network of organizations as the unit of analysis. While model-theoretic approaches do make important contributions to our knowledge, they run the risk of being insufficiently informed by the empirical realities they study (cf. Butler, 2003). Starting with theories abstracted from action, they might be less sensitive to what actually happens in organizations.

Practice-based approaches to learning and knowledge are an alternative to model-theoretic research (Schatzki et al., 2001). Researchers applying such approaches first seek deep understandings of the empirical reality at hand by closely observing how people's situated behaviors and collective use of tools, languages, and bodies of knowledge constitute their work, information, and learning practices, before they draw any theoretical conclusions. These social practices or the individuals inhabiting these practices are taken as the fundamental unit of analysis. Furthermore, this shift in researcher's perspective from 'organization-as-an-object' to 'organizing-as-dynamic activity' is combined with ethnographic, participant observer research methodologies. These methodologies enable the researcher to study the dynamics of organizational life and learning in 'real time', when practices actually materialize.

In this article, we report on an ethnography conducted on the reception of virtual communities in a large and distributed, knowledge intensive Dutch ICT firm, referred to as Dito. With the intention to support their work and learning practices, Dito offered its employees the opportunity to facilitate communities of practice and base these communities on a new groupware

technology. Communities of practice are “groups of people informally bound together by shared expertise and passion for a joint enterprise” (Wenger & Snyder, 2000: 139). Groupware is a self-service web tool for coordination, collaboration, and communication through shared access to technological capabilities such as common repositories, discussion forums, and communication facilities (Orlikowski, 1996). Although originally a broad conception of the community idea was used, the attention gradually shifted towards the virtual communities.

Many organizations are taking actions to stimulate knowledge generation and sharing, which, as in Dito, frequently include information and communication technologies as instruments promoting organizational learning. Like any organizational change idea, such technology-driven initiatives are always interpreted by all members of the organization involved (Bijker et al., 1987; Kopytoff, 1996). They will appropriate the technology, meaning that they “make active efforts to shape their lives through creative manipulation of artifacts, symbols and social systems in relation to their practical needs and competencies” (Carrier, 1990: 9). In this article, we will discuss the organizational discourse on virtual communities and illustrate how Dito’s management and moderators, but in particular how Dito’s employees as the intended users of the technology have appropriated the virtual community idea, showing all kinds of divergences and tensions between the practice espoused and actual practice. Differing appropriations among managers, moderators, and users cause a dynamic interplay of negotiations, the outcome of which is a result of continual mutual adaptation between these individuals. We will then delve deeply into the arguments and motives behind the employees’ appropriations. This deeper layer of investigation will explain their degrees of participation and non-participation in the virtual communities and thus the success of the change project. It will also reveal how users shape their work and learning practices. For users, the virtual communities created meant an extra source of information that had to compete with the many other available ‘resources in action’ (Suchman, 1987). Why would they adapt to the new technology and why would they not?

Hence, creative appropriation of technology by individuals shaping their learning practices is the theoretical point of departure in our practice-based study. The objective is to gain an in-depth understanding of the dynamic construction of these practices. The research questions that guided our study are: how and why do professional knowledge workers appropriate new technology?

What does that tell about how they organize their learning practices? And, what, if any, are the consequences for theorizing and researching organizational learning?

2. Ethnography

As said in the introduction, practice-based research often goes hand in hand with ethnographical methodologies. The choice for ethnography has to do with its preoccupation for ‘little narratives’ that help us understand the processes of negotiation between all those involved ‘from within.’ Furthermore, since ethnography pays attention to both the formal and the informal, “making the implicit explicit” (Schwartzman, 1993: 53), it throws new light on the ordinary and enables the search for the deeper structures of how people appropriate new technology and, in that way, the dynamic construction of work, information and learning practices. This study departs therefore from two mutually reinforcing notions: creative appropriation and individual tactics, the first coming from appropriation theory (a.o., Silverstone et al., 1992) and the second from De Certeau’s practice theory (1984). Before introducing the case setting and the methodologies used, we will first discuss these two notions.

2.1 Creative appropriation and individual tactics

Creative appropriation or active consumption stresses that users faced with new technology, as in our study with virtual communities, produce the technology while consuming it. Technology is never neutral. Encoded with normative narratives about users and their practices, implementing new technology always entails directed organizational change. When users interact with that new technology, they are confronted with these encoded narratives. This confrontation influences users in their perceptions of practice and professional identity as they tend to define themselves in the face of the new technology, whether or not they agree or disagree with the inscribed narratives. While responding to the narratives, users inscribe the technology with their own meanings, making it ‘their own’ to ensure the essence of their own economic, social and cultural ordering (Sahlins, 1998). In anthropology, this is referred to as ‘alternative modernities’ (Taylor, 1999), implying that users may appropriate new technology differently than intended by change agents such as the designers of the new technology or the managers who have decided to implement it. Consequently, at every stage of technology implementation and use, different meanings around the same technology are in constant negotiation, which implies that practice

and technology are recursively constructed as technology redefines users and users redefine technology.

De Certeau's notion of individual tactics underlines the idea of users' creative appropriation. It emphasizes, however, the *individual* responses to technology, in reaction to the implied sharedness in meaning of the organization's relevant social groups in the social construction of technology theory (Bijker *et al.*, 1987). In comparison with this theory, De Certeau adds an extra, deeper layer of analysis to paint an even richer picture of what happens in organizations when new technologies arrive. Another reason to use the notion of individual tactics is that it accentuates that users respond not only to the new technology as such, but also to the larger social structure in which it is embedded and others in that environment. Individual tactics are responses to strategies, as for instance organizational strategies objectified in technology, as well as responses to the context in which they are implemented. Creative appropriation should therefore be understood as the everyday negotiation of meaning within a multilayered context.

2.2 Case setting

The ethnography was conducted in Dito, a highly distributed ICT firm employing around 9000 people, who are spread over 15 subsidiaries with about 25 offices scattered over a number of European countries. Dito has its origins as a public body in that it partly stems from the Dutch state-owned computing center. Founded in 1950, the State Center for Mechanical Administration, as it was called, was concerned with salary administration by means of punch cards. In 1990, the computing center was partly privatized. As a consequence of taking over competitors, Dito no longer only supplied ICT products and services, broadly defined as 'infrastructure management services' and 'application services,' to the government but also to clients in sectors such as industry, banking, insurance, social security and health care.

After a few years of experimenting with on-line instruments, Dito implemented virtual communities to support their employees' learning and work practices. As a research team we witnessed this change project from the start and continued our exploratory study for 18 months. In that time 170 virtual communities had come into being in which, in terms of registered

usernames, 2742 employees participated. One and a half years after their introduction, therefore, the virtual communities represented about 30 percent of the firm's total population.

2.3 Connective ethnography

Traditionally, ethnographical studies explain how people think, believe, and behave or build theories of cultures that are situated in local time and space (LeComte & Schensul, 1999). Such traditional ethnographies do not suffice anymore, because computer-mediated communication does not occur in just one physical, local context, but also across time and space. What is needed is a connective ethnography (Hine, 2000) that extends the notion of context with the idea of connectivity between distributed people and systems. Other than Hine suggested, we also argue for the incorporation of both online and offline methods in the study of interpersonal computer-mediated communication.

This new concept of connective ethnography entails the mixing of a number of research methods. For our study, data were drawn from discourse analysis, interview and participant observation in the research organization, participant observation in and textual analysis of the virtual workspaces, and a social network analysis of the log file data stored by the system. First, discourse analysis showed how the virtual community idea was taken over from the relevant academic and popular literature and how it was subsequently introduced in Dito. Second, 50 formal interviews with employees distilled the various user experiences after which participant observation helped to connect these stories to the natural setting. The interviewees, who were guaranteed strict anonymity, referred to themselves as managers, consultants, project managers, data warehouse architects, sales account managers, and software engineers. Third, a social network analysis of the log file data stored by the system learned the extent to which the proposed virtual communities were appropriated in terms of actual information sharing relations between people and groups of people. Fourth, online participant observation and content analysis were used to understand how the various appropriation patterns discovered relate to the purpose of communication and the content of the messages posted. Last, the interviews and social network analysis directed our attention to the wider context of alternative resources in the form of both systems and people that employees call upon in their everyday work practice. Together, the various methods applied integrated the different levels of translation and appropriation of the

virtual community idea and add context to the ethnography in terms of intertextuality and the interconnection of people with and without the means of computer-mediated communication.

3. Change as discourse

We start the account of our study with a brief discussion of the organizational discourse on virtual community and show how this idea is enacted by Dito's management and subsequently introduced in the organization. The decision of Dito's management to create communities supported by groupware is in line with the increasing popularity of these instruments in the organizational discourse. Notably, the idea of community radiates a strongly optimistic promise: "community, we feel, is always a good thing" (Bauman, 2001: 1). As Rapport and Overing (2000) point out, "community [is] a concept of always positive evaluation and evocation, whose usage expresses and elicits a socio-cultural grouping and milieu to which people would expect, advocate, or wish to belong."

The optimistic and idealized portrayal of human practice is reflected in what community and groupware supposedly afford to the users. In terms of the affordances (Gibson, 1979) mentioned in literature (Wenger, 1998; Brown & Duguid, 2001; Duane & Finnegan, 2003), virtual communities are predominantly communicated as empowering tools *for* their users who wish to relate to each other on the basis of equality and for the common good of the group anchored in a strong sense of belonging. They would promote bottom-up knowledge sharing and, thus, new or improved ways of organizational learning. Furthermore, communities are presented as informal boundary spanning devices. They are said to enable increased connectivity across formal organizational structures and cultures to multiple information resources, in the form of both people and systems, crossing different time-space distances. This boundary spanning nature of communities includes enforcing horizontal as well as vertical social ties within the organization. People of all hierarchical and functional levels are meant to benefit from each other's knowledge and learning capabilities. In sum, virtual community would significantly contribute to the organization's ability to innovate and adapt to its changing environment by drawing people together whose knowledge would otherwise be too distributed and, hence, too difficult to access.

Faced with a rapidly deteriorating economy and a need for downsizing at the time of research, the virtual community idea is not solely interpreted by Dito's management and moderators in terms of the presumed affordances mentioned above. The emphasis is not only put on the ideal of knowledge sharing and learning, but also on efficiency, coordination, and surveillance. Typical examples of additional and deviating meanings attached to virtual community are that they are considered helpful in coordinating documents, activities, and working methods to minimize redundancy, that they can be used to present the firm as a coherent identity to the outside world, or that they can aid in keeping track of projects at clients' sites and in solving the problem of under-utilized consultants (for more details see Dirksen & Huizing, 2006).

Moreover, the appropriations of management and moderators found indicate that they want to control and monitor the creation and development of the virtual communities, which contradicts the alleged affordance of virtual community being an empowering tool *for* the users. Informative in this regard is the way Dito makes communities accessible to their prospective users. When employees want to start a community, the first step is to fill in a 'Request for community,' a digital form on the firm's intranet. The next step for responsible managers to arrange is an intake conversation with the applicants to assess their intentions. Subsequently, the managers determine what kind of information system would best suit their needs. In case of this being the community tool, the applicants are given the community template.

From this application procedure can be said that even though the technicality of the tool does allow for the spontaneous emergence of communities, management does not permit it. Moreover, communities are installed and members assigned by Dito's management on the basis of mere categorical membership. However, for communities to be the organization principle most effective in stewarding learning and innovation, they need a certain degree of informality and autonomy. This recommendation abundant in the organizational discourse is nevertheless overruled.

4. Contradicting affordances

In the next five sections we will describe in detail how Dito's employees have responded to the virtual community idea as it is expressed in organizational discourse and enacted by Dito's managers and moderators. We will provide cumulative layers of explanations for the appropriation and use patterns of the employees by increasingly delving deeper into the arguments used, thereby illustrating how the dynamic interplay of negotiation evolved in Dito, and how technology and learning practices recursively constitute each other.

The affordances of ICT in the particular context of Dito provide the first indications of how and why employees form deviant opinions on virtual community. These arguments oppose the view of virtual communities representing an informal, 'disembedded' notion of work (Forsythe, 2001). Instead, because it is mediated by technology, the virtual space is often perceived as an impersonal, abstracted and de-contextualized medium not suited for knowledge creation and sharing. While management envisions efficiency, coordination and surveillance gains, for many employees not meeting face-to-face implies a social deprivation of human interaction at the expense of cooperation. Moreover, the combination of the visibility of the author and the invisibility of the audience when expressing oneself in virtual spaces is frequently mentioned as a reason for not sharing real concerns through this medium. While enhanced visibility may imply an improved mechanism for management control, for employees it may very well entail unappreciated surveillance (Leigh Star & Strauss, 1999).

Another highly appraised feature of modern technology is the increased connectivity of information resources enabling the wide dissemination of the firm's available information, leading to potential benefits of not having to 'reinvent the wheel again' and information synergies. However, this feature requires the codification and abstraction of the knowledge to be shared, which inevitably means a loss of meaning (Polanyi, 1983). In addition, many employees find 'doing it themselves' a lot less time-consuming due to information overload and the troubles of finding what is needed.

The employees furthermore demonstrate how some technology attributes are incompatible with Dito's policies and structures, contradicting the spirit of community and the ideal of unfettered

social gathering. Technology potentially enables knowledge sharing across formal organizational boundaries, both horizontally and vertically. This potential, however, can be easily frustrated by the politics commonly found in organizations. As in Dito, the accountability and financial rewards of managers and employees can be grafted upon internal competition between subsidiaries, business units, departments, and individuals. As many employees experience, this internal competition has a major discouraging effect on cooperation in the virtual spaces, as knowledge sharing is not explicitly rewarded. Moreover, in situations where the boundary spanning potential of the medium is exploited, some local managers see this as a sign of diminishing loyalty to their units.

The research data furthermore indicate two opposing views on organizing knowledge within Dito. For management, the value of knowledge increases with the degree of dissemination within the company, which includes their anxiety of employees leaving the firm taking the knowledge with them. For employees, however, sharing knowledge may decrease its value. Hence, many of them hoard knowledge to increase their personal market value or out of fear of individual redundancy (Harrison, 1995), which contradicts the view of the employee as eager to learn and indiscriminately help others.

5. Resisting classifications

Although incited by the confrontation with the material elements of the change idea, additional arguments explaining deviances in the interpretations and behaviors of Dito's employees are found in the classifications of belonging the community idea proposes. When confronted with this idea, employees are prompted to determine what constitutes a community, who belongs, and what it is that makes them a cohesive group. As the term community implies, members should have something in common, but what denotes this commonality? The confrontation with the change idea therefore instigates judgments about professional identity, i.e. "the sense that [professionals] have of themselves as members of a category by virtue of their work" (Forsythe, 2001: 77). These judgments concern the variation in information needs and knowledge claims.

In general, people define themselves vis-à-vis a 'generalized other' (Mead, 1934) – be it the project, the client, the technology or the other members of the community. When asked to

explain their relative degree of participation in the communities, many employees see a mismatch with the information posted and attribute this mismatch to a high variation in information needs and rapidly shifting learning foci, resulting in memberships too diversified to be referred to as a cohesive group. Learning behavior is dependent upon the way people enact their roles and tasks (Leckie *et al.*, 1996). This implies that the learning behavior of employees is determined by what they hold key to their jobs: 1) the project(s) they are engaged in, 2) the client(s) they have to satisfy, and 3) the kind(s) of technology they are involved with. Working in Dito is frequently perceived as a series of often short-term projects. In addition, professional knowledge in ICT is generally seen as highly transient and susceptible to changes in the lifecycle of systems and the emergence of new technologies, often leading to the need to hyper specialize oneself, even on the level of software brands. Consequently, many employees have a short-term, highly focused and instant gratification view on learning and describe their learning behavior as too dynamic and specific for virtual communities to be cohesive and effective.

Similarly, perceived mismatches with the knowledge posted lead employees to define their 'knowledge claims' (McLaughlin & Webster, 1998), that is, they judge whether their knowledge is of a higher or lower quality than the common knowledge of the group. Some employees in Dito, for instance, attribute their non-posting behavior to feelings of inferiority. In the words of one interviewee: *"It is a kind of modesty. I do not find myself sufficiently knowledgeable to tell others about my expertise and skills."* In contrast, others explain their non-reading behavior with feelings of superiority: *"I do not think much of the average ICT person; incompetence rules all right."* Participation in the communities is furthermore related to how members profile themselves, indicating cultural differences as impediments to knowledge sharing: *"In the West [of the Netherlands], when you want to profile yourself, you will have to shout: 'Look at all the great things I have done'. We [in the North] are more collected, yet easily intimidated."*

Next, the division between professionals with and without thorough knowledge of technology is considered an important factor in explaining participation levels in the virtual communities: *"I am really more a generalist, a person with a helicopter view overlooking things and subsequently pointing out the important relations among the relevant factors. The average Dito employee, however, is at his best when detailed [technical] knowledge is required."*

Connected with this perceived difference between ‘generalists’ and ‘specialists’ or between ‘techies’ and ‘socio’s’ are the judgments made about good selves and bad selves. “‘Bad selves’ are the kind of person the community cannot tolerate and ‘good selves’ are the type of person the community must have” (Pfaffenberger, 1999: 153-4). These judgments express what people think should be the norm, in this case what an ICT professional should know in terms of the skills and competences required. Such judgments determine whether or not co-workers are perceived as righteous members of the group, while disagreements on the professional norms can affect people’s opinions on group cohesiveness. For instance, some respondents consider technical knowledge as indispensable for ICT professionals: “*One needs a substantial degree of technical baggage, because when technical terms are discussed and you have to admit that you cannot follow the arguments, the client might think ‘what do we gain with this person?’*” Others, however, attach fundamentally different meanings to ICT professionals: “*Not having ICT knowledge as a consultant does not necessarily have to hinder you.*”

Summarized, instead of confirming communities as harmonious entities, the research data show dichotomies fragmenting the groups and preventing them from functioning as cohesive entities: 1) the elder, established professional versus the novice or less experienced employee, 2) people from region A versus those from region B, 3) the generalists versus the specialists 4) and the techies versus the socio’s. These dichotomies are seen as indications that management’s decision to impose groups through categorical membership contributes to an artificialization of firm practice in that, as the next sections will further illustrate, the boundaries of the formal groups created do not concur with employees’ established and emerging learning practices.

6. Other information resources in action

More arguments explaining employees’ appropriations can be found by asking the respondents how they make use of the other ‘information resources in action’ (Suchman, 1987), in this case: other virtual communities, other digital and non-digital information resources and, most importantly, personal social networks.

As the social network analysis performed on the log file data displays, people simultaneously participate in different virtual groups to enact the various roles assumed as part of organizational life. The average number of memberships per participant, referred to as connectivity, is 1,8. Some people hold up to 7 or 8 memberships. Representing exemplary outcomes of social network analysis, Figure 1 contains four selected formal communities, two technically oriented and two business oriented: software engineers, object oriented technology, project managers, and consultants. The participants are represented by the dots and the various other virtual groups they are connected with by squares. The closer participants are positioned to the center of the selected group, the more active the members are in that community. Conversely, the more participants approach the squares, the more active they are in the other groups they are connected with. Furthermore, the closer the squares are to the graph's center, the more participants in the group jointly share memberships in other, referral groups. These graphs thus measure the extent of connectivity in terms of strength of ties *and* multiple memberships, showing the internal cohesion or fragmentation of the communities.

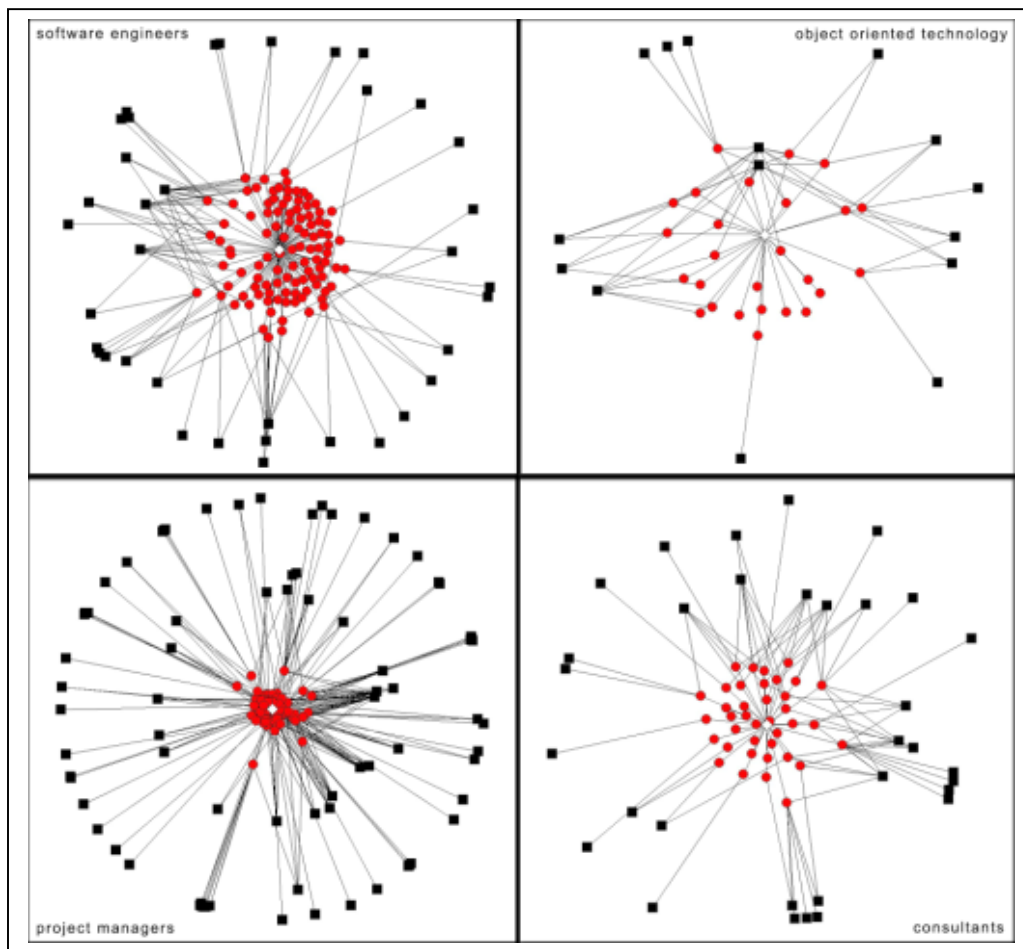


Figure 1 Social network graphs

The graphs demonstrate that the object orientation group features a relatively low internal cohesion, high connectivity and a noticeable high extent of shared memberships in other groups indicating distinguishable referral groups. In contrast, the software engineers combine a relatively high internal cohesion with moderate connectivity and few overlapping memberships in other groups. The consultants score relatively low on internal cohesion, high on connectivity, and low on overlapping membership. Last, the project managers have a relatively cohesive group, are well connected to other groups and the ‘inner circle of squares’ that is relatively close to the graph’s center suggests a high extent of overlapping memberships. As confirmed by content analysis and interviews, the relatively high internal cohesion of the project managers can be explained by their mutual practice in sharing codified and abstracted knowledge such as project plans and standard templates, while their relatively high connectivity originates from the need to be knowledgeable about the large diversity in types of clients and sectors to be served. Project managers typically share project management knowledge with other project managers, and seek other groups for knowledge on joint clients and sectors. On the other hand, for instance consultants have less concrete knowledge to share internally and less overlapping memberships in other groups, thus operate more individually. “Disembedding is (...) fundamental to the organizational structure of consulting” (Amit & Rapport, 2002: 29).

Table 1 Formal communities versus N3-groups

		Formal communities	N3-networks
	Size	170	124
Degree of connectivity (in %)	Mean	10,2	98,4
	Std dev	11,5	6,4
	Max	83,4	99,8

Table 1 illustrates the lack of cohesion in the 170 formal communities that existed 18 months after the virtual community tool had been installed. By taking ‘shared memberships in other groups’ as the measure for the degree of connectivity – the so-called N3-networks –, it shows that there are 124 networks of employees that are almost ten times as connected as the formal groups. This is a clear sign of the existence of alternative networks of people operating across the

formal boundaries. Comparing the mean and maximum scores additionally leads to the observation that some of the imposed groups are well connected. With a mean score of 10,2 percent, a maximum score of 83,4 percent and a standard deviation of 11,5 percent, however, that does not apply for many groups.

Finally, Figure 2 shows how the creation of formal communities aimed at interrelating distributed knowledge can result in the opposite effect of ‘island formation’ and ‘knowledge disintegration.’ We randomly selected one knowledge topic appearing in the log file – ‘SAP’ –, and subsequently investigated to what extent people sharing an interest in this topic are engaged in knowledge relationships. As the social network graph attests, they do not. While the topic of ‘SAP’ is discussed in sixteen formal groups, there are no links of communication among these groups. These groups act out as knowledge islands that prove to be difficult to access for others. The community idea, therefore, can contribute to the formation of separate groups concerned with the same topic, though not involved in knowledge relationships with each other.

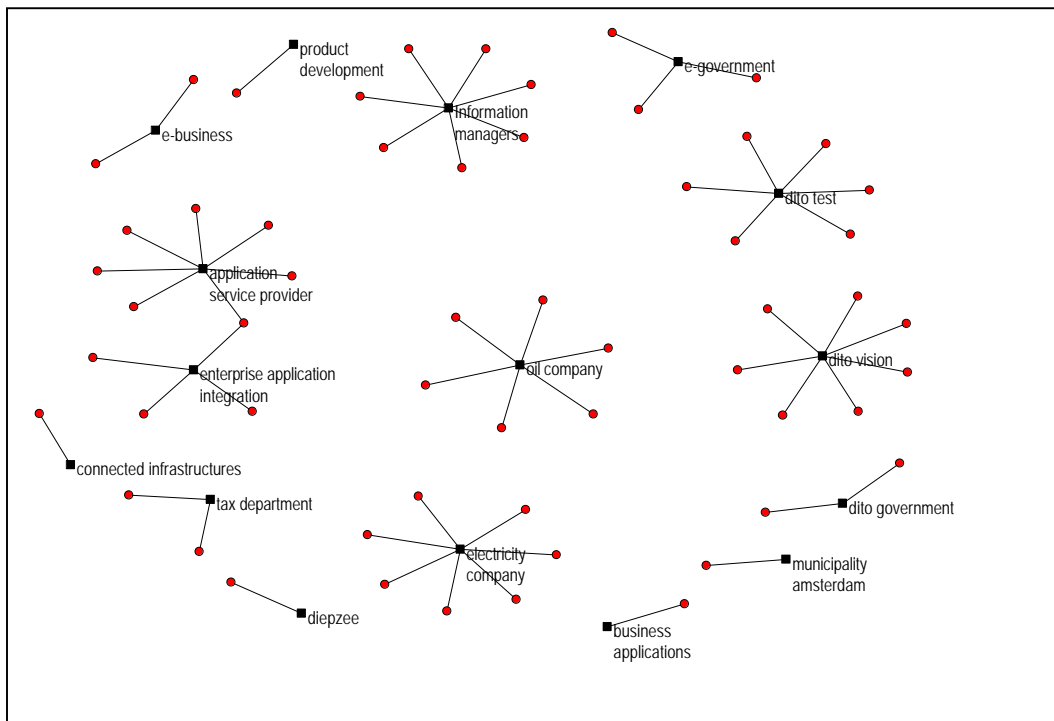


Figure 2 ‘Island formation’

Hence, social network analysis underlines the observations made in the previous section: many of the imposed communities do not function as expressed in the organizational discourse and only partly reflect management's intentions. The quantitative data portray a lack of group cohesion and social fragmentation. The pursuit of closer cooperation and greater consensus among committed employees to facilitate learning and coordinated action might therefore evoke the adverse effects of decreased social cohesion and innovativeness (Fernback & Thompson, 1995; Powell *et al.*, 1996; Willson, 2000). As Bauman (1991: 251) remarks: "Each attempt at convergence and synthesis leads to new splits and divisions", which turns "the search for community (...) into a major obstacle to its formation." This is precisely what happens at Dito.

7. Alternative networks of belonging

Subsequently, in search of the actual networks people belong to, alternative information resources drawn upon need to be included. People generally use a multiplicity of formal and informal information resources to be able to do their jobs: journals, books, courses, seminars, internal and external information systems, internet-based newsletters, mailing lists, on-line support groups, and web sites. The virtual communities inevitably have to compete for attention with all these information resources, a factor contributing to the observed lack of group cohesion because no organization can single-handedly decide on what counts as knowledge in the relevant domains of expertise and because people seek the channels of least resistance.

Alternative information resources point at people's overall reliance on personal social networks. We deliberately speak of *networks* instead of *communities* to underline that they concern the empirically observed rather than the idealized, imposed groupings. Personal social networks emerge in the professional sphere yet are inherently social, reflecting that people in organizations are not only drawn together professionally, but also socially. They are ego-based in that "they arise through particular individual's efforts, experiences and history" (Amit & Rapport, 2002: 22) and "extend across different categories and situations" (*ibid*: 23). They refer to a form of relationship that is not necessarily institutionalized and often is structurally ephemeral as opposed to the more enduring social groups such as organizations. "Such networks operate in

their own right and on distinctive terms” (ibid: 22). In this section we unravel the arrangement of these networks and the principles by which they are organized.

Personal social networks do not rest on categorical membership. Instead, they draw on people’s commitment and identification. Investigation of these factors permits “empirical determination of who – which collective entities or social worlds – are the arena” (Clarke, 1991: 128). In Dito, employees express a variety of objects of commitment. Only few people feel themselves committed to the focal organization or to specific units such as subsidiaries and business units: *“Dito is the firm I happen to work for. This could just as well be a different organization. But on the other hand, I can be said to be quite loyal. After all, I have been working here for the last 16 years!”* Instead, many employees refer to themselves as their major object of commitment: *“That’s me. And I do not mean as if I am antisocial or something...”* Some people explicitly mention former colleagues: *“I have strong bonds with former colleagues; the people I used to work with are my chief network.”* References made to other people and structures outside of Dito such as professional associations, clients and competitors are also frequently noticed: *“I do experience a strong commitment with the client. That might be a need to identify myself with something tangible after all. Dito, on the other hand, that’s a bridge too far.”* It is furthermore noteworthy that although the participants reside in an ICT firm and their everyday work practices revolve around technology, only very few informants display a special interest in or caring for ICT. In fact, most of them express a certain degree of detachment or non-identification with ICT: *“I might just as well be working in a construction firm.”*

As to the main reason to create and maintain personal social relationships, people focus on ‘supplementary competences’ or ‘affinity and personal liking,’ which both build on feelings of trust grown upon a shared history of interactions and experiences. Supplementary competences refer to the potential benefits of the relationships: *“[Colleagues] all have their own area of expertise they excel in. One is good in dispatches, the other in technical programming. Well, gradually you try to gather all that information and eventually it also becomes your own and that enables you to act more independently.”* Others, however, emphasize affinity: *“There are only a few meetings I clear my agenda for, and I do so for the project management group. Not so much because I have a relationship with the group, but more so because I feel committed to certain*

people within the group.” As the research data indicate, ‘affinity networks’ prevail over ‘competence networks.’

Abstracting from the personal remarks mentioned, commitment, aside from mere membership, is a matter of calculated *and* affective identification. Organizing personal networks around the notion of supplementary competences is exemplary for calculated identification. This kind of identification is based upon the broader principle of reciprocity or exchange, that is, “a voluntary agreement involving the offer of any sort of present, continuing, or future utility in exchange for utilities of any sort offered in return” (Weber in Woolsey Biggart & Delbridge, 2004: 31). People help others, but expect that, somewhere, somehow, the favor will be returned. The organizing principle of affinity, on the other hand, implies that personal networks are formed and sustained by people liking each other: “*If I have to get around the table with the biggest jerks only because that could be meaningful for my network, I won’t do it.*” As opposed to calculated identification involving obligations towards each other, affective identification addresses commitment as people’s true engagements and interests (Knorr Cetina & Bruegger, 2002). Depending on personal and situational conditions and on their interactional history (Nardi *et al.*, 2002), people can and do shift their identification balance between calculation and affection.

In sum, the previous sections indicate an overall lack of cohesion in and a consequent lack of identification with the virtual communities prescribed in Dito. After this deconstruction of the groups imposed, this section reconstructs the boundaries of the social networks people actually engage in and identify with. Together, they show that most employees have a different view of practice and professional identity than is presented in the ideal of virtual community as expressed in the organizational discourse and in management’s appropriations of this ideal. This observation not only provides explanations for the way employees have appropriated the community idea, it also illustrates that people organize themselves in ‘networks of belonging’ and engage in informal knowledge relationships and learning practices on the basis of membership, reciprocity, and professional identification.

8. Appropriation by the employees

The previous sections show a diversity of cumulative arguments that employees use while making sense of the virtual community idea and the explicit and implicit messages conveyed by Dito's managers and moderators. The extents to which they attach importance to these arguments determine the way they appropriate this change idea and hence how they will use it. Out of these personal responses, which can be any combination of the arguments used, four generalized appropriation patterns emerge: confirmation, socialization, reputation, and negation. These patterns collectively present a different reception of the virtual community idea than intended by Dito's management and moderators and implied in the idealized representations of both technology and human practice in the organizational discourse. They also illustrate that knowledge professionals organize their learning practices in personal social networks, and evaluate the value of new information resources provided by their employer and hence their contribution to these resources from those established practices and their sense of professional identity.

Confirmation is the appropriation pattern that resembles the community ideal most closely. In these cases of 'acted inscription' (cf. Akrich & Latour, 1992), virtual workspaces are used to share and create knowledge. We say 'most closely' instead of 'completely,' because content analysis of the virtual spaces illustrates that there is a correlation between the degree of codification of the knowledge shared and the appropriation patterns. The more complex or real the topic at hand, the more rich communication is needed, the more employees seek other channels to satisfy their learning needs. However, for codified knowledge, such as concerning technical expertise, the virtual communities are readily used.

Socialization, in terms of learning to become a member of a professional group, is another response pattern. It refers to the move of the outsider, a novice or newcomer to the group or the organization, becoming an insider (Trice, 1993). Novices and newcomers typically use virtual communities as a 'mirror of knowledge' to assess their level of competence and to find out what knowledge needs to be internalized to become an accepted and full member of the professional group.

Reputation is the pattern whereby the virtual community is employed as a tool for self-marketing. Through this channel, employees profile their professional identity. They present their 'face' (Goffman, 1959) by showing other members of the group and other groups in the firm who they are, what they have done, and what their expertise is. It is not the knowledge itself that is being shared, but information about the person holding that knowledge. The virtual communities are thus interpreted not so much as learning devices, but as one of the tools available to guide the impressions others in the firm and clients form of him (Donath, 1997).

Last, *negation* refers to the intentional or unintentional behavior of employees barely contributing to the formalized and imposed communities, or not at all. We found that this pattern typically concerns the most experienced, knowledgeable, and skilled employees in the different domains of expertise. For them, the communities represent what is already known instead of what is being discovered.

9. Conclusions and discussion

The four appropriation patterns found indicate that people respond to change ideas by comparing the prescribed behavioral norms and essences of professional selves with how they naturally engage in practices of social networking, learning, and professional identity construction. On those terms, they decide to participate in new organizational initiatives or not. In Dito, the employees react for instance to the classifications of membership imposed and notice that these classifications do not concur with their common practice of forming groups on the basis of calculative and affective identification and on the basis of membership statuses such as the novice and the elder. That partly explains the relatively high degree of non-participation in this knowledge initiative.

The four appropriation patterns can be further explained by distinguishing confirmation and socialization from reputation and negation. The confirming and socializing appropriation patterns relate to the use of internal systems as it is intended in organizational discourse and, in this study, by Dito's management and moderators. Participation in internal systems is directed towards merging existing personal expertise with firm-specific knowledge to become a more

knowledgeable, esteemed professional. All kinds of knowledge management and other initiatives aimed at organizational learning match the confirming and socializing patterns. The reputation and negation appropriation patterns, however, question the purpose and functionality of such initiatives. Our finding that the most skilled, experienced and knowledgeable professionals hardly participate as intended is particularly worrisome, because they are the experts most needed for knowledge generation and sharing. Without their presence, the less experienced, junior or new employees will not find what they mostly need at the intended places. As a result, it is only a matter of time before they will start retreating themselves from such knowledge initiatives too.

The reputation and negation patterns also illustrate that experienced knowledge professionals to a large degree shape their learning practices in forms of organization that are located outside their employer's. These other forms of organization are described in the literature under many headings: intensional networks (Nardi et al., 2002), actor-networks (Latour, 1996), networks of strong and weak ties (Granovetter, 1973), knots (Engeström et al., 1999), to mention a few. What we have called 'personal social networks' fits this line of research in that all forms of organization mentioned reflect the development in our societies that weaker social ties are increasingly favored over stronger ones in organizational contexts. From this perspective it is not surprising that identity and communities of practice as 'homes of identity' (Wenger, 1998) have recently attracted so much attention. "Just as community collapses, identity is invented" (Young in Bauman, 2001: 128).

In Dito, employees responded to the prescription of strong social ties with internal colleagues anchored in a bonding sense of belonging, which in the community concept are deemed necessary to improve the organization's capabilities to learn and innovate, and perceive contradictions with the organization's institutional logic that is geared towards internal competition. Hence, the conditions for knowledge hoarding within organizational boundaries rather than for knowledge sharing across those boundaries are institutionalized into Dito's accountability and reward system. Additionally, the implied strong ties to learn from co-workers disagree with the nature of work in Dito. Work in this organization is characterized by a high degree of specialization, rapid knowledge development, short-term projects, regular changes due

to sequences of mergers and acquisitions, and decreasing job security resulting from disappearing life-time employment - all those features that are common to knowledge work in general. In such situations where flexibility is needed (Beck, 1992), fleeting forms of cooperation and weak social ties prove to be more useful for people than long-term, intense relations, which require a 'certain degree of aloofness' and a 'superficial willingness to cooperate' rather than tight social bonds and behavior departing from values such as loyalty (Sennett, 1998).

Granovetter's (1973) observation that 'the force of weak social ties' typifies modern institutional networks is reflected in the case of Dito and its practices of knowledge sharing and information systems use. The flexible nature of work results in many professionals having short-term and highly directed information needs. Consequently, they use the available information systems for instant gratification rather than for deeper and sustained forms of learning. They are so specialized or knowledgeable that they, rightly or wrongly, believe they can only find interesting learning partners in the 'outside world,' and use the internal systems as reputation mechanisms, or not at all. They react to the increased risk of losing their job by shifting their loyalty from their employer to their domains of knowledge and the attendant personal social networks to keep abreast of new developments and maintain their market value, and prefer external above internal information sources. All these reactions question the validity and productivity of internally-bound organizational learning initiatives.

Hence, the four generalized appropriation patterns show potential conflicts for professional knowledge workers and their employers. On the one hand, knowledge workers are faced with the pressures and inducements imposed on them by the formal organization in which they have to perform and, on the other hand, they sometimes need or prefer to work around the formal structures, rules and regulations to maintain and develop their sense of professional identity. Over the past decades, employees' loyalty has shifted from their employer to their knowledge domain, also induced by human resources policies increasingly approaching labor relations from a cost-benefit analysis, focusing on short term performance. Arguably the largest challenge for management is maintain a 'balance of loyalty' for organizational knowledge and learning initiatives to prosper. That includes adjusting the accountability and reward systems used in such

a way that they contribute to organizational learning rather than, as in Dito, obstruct it.

Another consequence of our study relates to organizational learning as a field of research and the research methodologies applied. As said in the introduction, model-theoretic approaches often take the organization as the unit of analysis. Knowledge professionals, however, neglect all organizational boundaries when it comes to learning. They learn borderless. Relevant practice-based approaches on their turn often confine their investigations to learning in strict relation to work practices. Nevertheless, not all learning is directly related to work. In order to better understand the knowledge professional's information and learning behavior we argue for more 'follow the user' research that is focused on individuals and the tactics they employ. In a world of many digital and non-digital information sources and media, such a research approach also implicates adjustments in research methodology. Information and learning behavior is mainly informal, heterogeneous, and difficult to visualize. Practice-based research in the form of a connective ethnography including a rich mix of methods, such as applied in this study, is a prime candidate to deal with these behavioral idiosyncrasies.

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The Networking Knowledge Worker, Technology Appropriation and the Shaping of Learning Practices

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Abstract: This article reports on an ethnographic study performed in a large and distributed, knowledge intensive ICT company. It gives an in-depth account of the introduction of virtual communities in this organization and what happened afterwards. When confronted with organizational change ideas such as virtual community, people make sense of and appropriate these ideas to make them ‘their own.’ We delve deeply into the arguments and motives behind the appropriations of the company’s employees, which results into four generalized appropriation patterns. These appropriations patterns indicate that people respond to change ideas by comparing the behavioral norms and essences of professional selves prescribed in these ideas with how they naturally engage in practices of social networking, learning, and professional identity construction. This behavior not only explains their degrees of participation and non-participation in the virtual communities created, but it also reveals how employees shape their work and learning practices.

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