Contextualizations in a Social Network

Context in Social networks and virtual communities

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ABSTRACT. This paper proposes a context-based approach of social networks and virtual communities in the enterprise area. We point out that making context explicit it is possible to provide a global picture of the main aspects of social networks. A first result of this study is that the explicit consideration of contexts—especially shared contexts—could improve notably the collaborative-work processes in an enterprise. A second result shows the interest of considering simultaneously the paradigms of context and social network when IT is at the core of the enterprise. A third result is to point out that different types of context account for the flux of information between groups as well as inside each group. Finally, we point out that it is preferable to speak of contextualizations of a social network rather than virtual communities.

RÉSUMÉ. Nous proposons dans ce papier une approche des réseaux sociaux et des communautés virtuelles basée sur le contexte que nous discutons dans le cadre d’une application grandeur réelle. Nous montrons comment l’explicitation du contexte permet d’obtenir une vue globale des principaux aspects des réseaux sociaux. Un premier résultat est de montrer comment l’explicitation du contexte, et particulièrement les contextes partagés, améliore notablement les processus de travail collaboratif au sein d’une entreprise. Un deuxième résultat montre l’intérêt de considérer simultanément les paradigms de contexte et réseaux sociaux quand l’entreprise se dote de systèmes d’information. Un troisième résultat montre l’intérêt d’identifier les différents types de contexte dans les flux d’information inter- et intra-groupes dans une entreprise. Finalement, nous montrons pourquoi il est préférable de parler de contextualisations d’un réseau social plutôt que de communautés virtuelles.

KEYWORDS: social network, virtual community, context, proceduralized context, contextualization, application in an enterprise.

MOTS-CLÉS : réseau social, communauté virtuelle, contexte procéduralisé, contextualisation, application dans le domaine de l’entreprise.
1. Introduction

Facing rapid changes resulting from information and communication technologies (ICT), many organizations enlarge their collaborative decision-making processes. Decision makers work together but not necessarily at the same time and at the same place. They are supported by communication systems like e-mail or by Groupware systems, which constitute a kind of electronic infrastructure superposed on hierarchical organizations.

Adam (Adam and Pomerol, 2001, Adam et al., 2004) presented the case study of XYZ Publications Ltd., a news organization which publishes two newspapers: a national morning paper and a local afternoon paper. The study was lead to understand the nature of the changes undergone by the firm and analyze the group dimension of its decision making processes.

In this paper, we consider the role played by context when the enterprise is considered in terms of social network. Organizations are fundamentally information-processing structures (Kunz et al., 1998). In this view, an organization is an information-processing and communication system, structured to accomplish a specific set of tasks, and composed of actors that process information. Thus the enterprise is like an "information space" with information fluxes between individuals. An enterprise can be compared to a social network, which constitutes a complex network of data, information and knowledge. Several communities appear at the different steps of the information-management process corresponding to a series of specific focuses of attention.

There is a heterogeneity of contexts (personal context, board context, external source contexts, etc.), which have different granularities (the firm context, the board context, the employee context, etc.). However, the key point is that the complex information fluxes circulating inside the enterprise can be understood as information transfers between contexts at the different granularities.

Hereafter, the paper is organized in the following way. Section 2 gives the meaning given to the terms used in the paper, namely context, social network, virtual community and group. Section 3 revisits the case study of the XYZ firm in the light of the notions of context, social network, virtual community and group. Section 4 points out aspects of context that appear important in the case study and gives some insight on the role of context in social networks. Section 5 concludes and proposes some challenging perspectives.
2. Some terminological definitions

2.1. External knowledge, contextual knowledge and proceduralized context

We consider three types of context, namely the external knowledge (Brézillon and Pomerol, 1999), the contextual knowledge and the proceduralized context.

As Figure 1 shows, at a given focus of attention, one distinguishes the part of the context that is relevant at this step and the part that is not relevant. The latter part is called external knowledge. The former part is called contextual knowledge, and obviously depends on the agent and the current focus of attention. Always for the given focus, a part of the contextual knowledge is proceduralized to be used at the focus of attention. We call it the proceduralized context. The proceduralized context is the part of the contextual knowledge that is invoked, assembled, structured and situated according to the given focus. Thus, the focus of attention and its associated context are strongly intertwined.

Contextual knowledge is more or less similar to what people generally have in mind about the term 'context'. Contextual knowledge is personal to an agent and has no clear limit (McCarthy, 1993). Contextual knowledge is evoked by situations and events, and loosely tied to a task or a goal. When the task becomes more precise, a part of this contextual knowledge can be proceduralized according to the current focus of attention. Although the contextual knowledge exists in theory, it is actually implicit and latent, and is not usable unless a goal (or an intention) appears as a focus. When an unexpected event occurs, actor’s attention is focused on it and a part of the contextual knowledge will be proceduralized accordingly in order to adapt the
decision-making process to this new event. Once the new event has been treated, the proceduralized context goes back in the contextual knowledge of the persons having participated in his building and become a piece of their shared context.

The context is dynamic (Brézillon, 2003a, 2003b), and the dynamic dimension corresponds mainly to a movement between contextual knowledge and proceduralized context during the evolution of the focus of attention: From one step to the next, a piece of contextual knowledge enters the proceduralized context or, conversely, the proceduralized context goes back in the contextual knowledge and becomes a “chunk of (contextual) knowledge” a la Schank (1982) in the body of contextual knowledge and this chunk of contextual knowledge can be recalled later as a whole in a new proceduralized context. Thus, the more a person is experimenced, the more the person possesses available structured knowledge (i.e. chunks of contextual knowledge).

The building of a proceduralized context from the contextual knowledge sometimes does not correspond to the focus. As a consequence, there is a need to add some pieces of external knowledge in the proceduralized-context building. This situation corresponds to an incremental process of (1) acquisition of new knowledge pieces, and (2) learning of a new knowledge structure as a proceduralized context.

2.2. Social networks and communities

A social network is the connection of people by a computer network (Wellman, 1997), and the Internet will be the larger social network that we will consider in this paper. The main point is that a social network is composed of actors and ties between them (e.g. see Hanneman, 2001). Ties in a social network are numerous and of different natures: familial ties, lifelong friend ties, marital ties, business partner ties, that are important for people to obtain the fundamentals of identity, affection, emotional and material support (Rheingold, 2002), i.e. the recognition of their existence by others. However, the commitment of individuals is superficial, limited to the reasons of the local interaction. As a consequence, ties in a social network are "socially-oriented" like in the real life (weak ties), trust does not play an important role, and individuals generally belong to several social networks.

A discriminating factor allows to contrast the social network with respect to its environment. Thus, it differentiates individuals in a social network and individuals in its environment. For example, registration to a mailing list on a specific topic is to enter a social network where you will find (or may provide) information on the topic, but ties with other members do not matter essentially or would suppose the development of specific interaction inside some groups of the social network. Individuals in the social network are called actors for differentiating them from individuals in the environment of the social network.
The multiplicity of ties between actors implies that the emphasis on one type of social network or another one will depend on the viewpoint chosen on the social network. Thus, the main characteristics of a social network are a flexible structure, a lack of hierarchy, and weak importance of the emotional dimension (Foucault et al., 2002). From an information point of view, any actor in a social network is an information hub, but generally not an information transformer.

There exist many discriminating factors, and as many social networks as discriminating factors. A discriminating factor does not imply strong ties among actors because a discriminating factor is neither a goal shared by actors of the social network nor a common focus of attention of the actors. For example, a discriminating factor is "Living in France" and all actors in this social network share some common interests on, say, French cooking and wine, but will not act collectively in the same direction for that purpose. Belonging to a social network does not suppose that actors have an active role in it.

The main difference, which is identified in the literature between a virtual community and a social network, concerns computer-mediated means. The key point is the distinction between the computer-mediated communication concerning either individuals (e-mail, chat, blogs, etc.) or collaborative work (writing, designing, etc.). Clearly the collaborative decision making is ascribed in this second realm, and then the "community" aspect is more important than the "virtual" aspect. Indeed, there are different types of community that have been identified as virtual community, community of practice, community of interest, etc. We consider in this paper a virtual community as an instance of a community. Moreover, a community is characterized by a focus that depends on the type of community: a focus of attention for a virtual community, a focus of interest for a community of practice, etc.

The Information and Communication Technology (ICT) provides an electronic infrastructure for the organization, which is supposed to reinforce the coherence of the virtual community. However, there is more than a difference of infrastructure between a social network and a virtual community. A virtual community is a part of a social network to realize a collaborative work in order to satisfy a given focus of attention.

A virtual community is a group of actors who have regular contact with one another in cyberspace, with shared interests, problems or ideas (i.e. a shared focus of attention), independently of space and time. A main characteristic of virtual communities is that they are homogeneous and organized networks of individuals with similar attitudes and life-styles (Feld, 1981), and they are intentional formations (Valtersson, 1999). This cohesiveness of the virtual community with respect to the rest of the social network is given by the common focus of attention of all the actors.

The focus of attention gives a structure on the virtual community by defining an organization of roles on the virtual community and a coordination of the collaborative work of actors. The focus of attention acts like an internal engine to
impulse the virtual community. Actors have then a strong motivation in the realization of the focus and each actor assumes an active role to satisfy this process. Thus, actors in a virtual community are “socially interdependent” (Bellah et al., 1985), not uniquely "socially-oriented” like in the social network. A parallel in the domain of decision making, would allow to say that one may observe only a diluted decision making in a social network and a collaborative decision making in a virtual community.

In a virtual community, the focus of attention affects actors as a glue force that influence ties between actors (directly connected to the focus of attention) and the related roles that actors have to play and the corresponding tasks to accomplish, although the virtual community stays primarily a social network and keeps all its characteristics in a context that is strongly related to the focus of attention of the virtual community.

2.3. Notion of group

In the previous paragraph, we discuss of two types of organizational entities, namely social networks and virtual communities. However, there exist a number of similar entities, such as community of practice, online community, community of interest, etc. In this section we introduce the main characteristics of organizational entities, knowing that these entities have not all the same granularity in an organization.

2.3.1. Cohesiveness and size of groups

Groups are important organizational entities, because groups are more efficient than individuals in tackling most tasks. These social aggregates involve mutual awareness and potential mutual interaction. In (Huczynski and Buchanan, 1985), individual’s behaviors may change to conform to the norms of the group they belong to, especially for large and decentralized groups. In (Seashore, 1954) it is observed that individual behavior is even less likely to deviate from that of the other group members when the group is strongly cohesive. In terms of context, group members try to align their individual contexts on the group context in order to make compatible their individual contexts with the shared context of the group. However, individual contexts are not included in the group context.

This supposes that all group members know one another, and the group has a small size. Bossard (1945) shows a drastic increase in the number of relationships group members must cope with when group size increases (25 relations for 4 members and 966 for 7 for instance). This communication overhead decreases the time available for communication between any two individuals within the group because individuals have to maintain more complex sets of social relationships. In terms of context, a conclusion could be that the bigger a classical group is large, the more it is difficult to develop a shared context.
2.3.2. The ICT effect on groups

ICT allows large units (e.g. sub-organizations) to behave as groups because they increase the opportunity for interaction between members and raise their awareness of each other. High interactivity resulting from ICT leads, on the one hand, to the development of a robust and cohesive shared context whatever the size of the group is and, on the other hand, to a quick adaptation of the group to environmental changes. A good example of this situation is a mailing list around a given topic because communication is one-to-several rather than one-to-one.

Groups could be sometimes instruments of conflict rather than cooperation within organizations. Thus, the relationships inter-groups (as opposed to intra-groups as discussed above) must also be considered because the greater the degree of cohesiveness within each group, the greater the likelihood of grave inter-group problems developing. In terms of context, we have seen that the group context is a shared context for the members of the group. At the level above of the community or the organization in which different groups evolve, it is also important to transform the organization or community context in a real shared context for all the groups in order to avoid conflict at the group level.

2.3.3. Permanent and temporary groups

The functioning of an enterprise results of an “official” vision of what the organization should look like and how it should operate. As a consequence, there is an organization structure in terms of a hierarchy of permanent groups (e.g. the Sales Department).

By contrast, emergent groups arise out of every day interaction between the members of the firm as problems and opportunities hit them and the organization, and live as long as the triggering problem or opportunity. These temporary groups are transversal to the organization structure. This endows the organization of a double structure, a static one given by the permanent groups and a dynamic one given by the temporary groups.

In terms of context, the shared context associated with a permanent group presents a stable set of contextual knowledge, when the shared context of temporary groups needs to be build on the fly from the shared context of the enterprise and permanent groups from where are coming actors of the temporary groups each time a problem or an opportunity appears.

2.3.4. Group structures and contexts

Adam (Adam et al., 2004) propose an interpretation of different group configurations identified in (Leavitt, 1951). Figure 2 presents these configurations.

Adam et al. (2004) show that the wheel and the Y networks are the fastest shapes as information is sent to the ‘centre’ of the network (node C) where a decision is made and sent to the outside, but the wheel network tends to be faster. The chain
also functions by sending information towards the centre and sending the decision back towards the outside, but takes longer to establish itself. In the circle network, more errors are made and the number of messages required to reach a decision is the greatest of all shapes.

Figure 2. Network configurations investigated in previous research (from Leavitt, 1951)

However, network performances depend on task complexity. Centralized networks do not perform as well for complex tasks as they do for the simple tasks. As the task becomes too complex, the central node (person) in the network becomes saturated and performance is poor. By contrast, the decentralized networks that are somewhat inefficient for simple problems (no one has all the required information), deliver much better performance for complex tasks because nobody in the network becomes saturated. Group configurations must be considered also with the characteristics of the communication needs during task accomplishment. There are two main characteristics of communication for our purpose, namely the density of interactions and the type of treatment made by each actor in the information exchanges.

In terms of context, interaction density and information management influence the type of interpretation made by each actor receiving and transmitting information. Here, the shared contexts of an actor with other actors with which ties exist plays a central role: The more a shared context between two actors is developed, the faster information management is. When an actor plays a central role as in the Y or wheel configurations, this central actor has several different shared contexts to manage with other actors. When different paths exist between the emitter and a final receiver, such as in the Circle configuration, the receiver can obtain as many different interpretations from the emitter as existing paths.

We retain two main lessons. First, the shared context is important to develop and to reinforce is the group context for providing a common background to each actor.
and reducing thus the importance of the shared contexts between actors with ties. Second, when it is possible a complex task must be divided in subtasks taken in charge by sub-groups more homogeneous. Thus, at the level of the group, interaction density and information management decrease; subgroups become a kind of task forces and then are more efficient because having a shared context with a reinforced cohesiveness.

3. Case study of the XYZ firm

3.1. The XYZ firm in terms of group

Adam (Adam et al., 2004), following a first study in (Adam and Pomerol, 2001) present a case study that we will use for discussing the different elements on context and group introduced previously. XYZ Publications Ltd. (XYZ hereafter) is a news organization which publishes two newspapers. Given the nature of XYZ’s products, group work and collaborative work within the editorial team (holding a central position in XYZ) and the many other supporting actors that help them to create the newspaper are at the core of the business. XYZ is organized around a number of loosely coupled clusters or groups of actors (a mosaic of semi-dynamically created groupings that had to communicate in order to collaborate) specializing in the different aspects of the business dynamically shaped and reshaped by projects as they occur. As a consequence, an actor of a permanent group can enter a temporary workgroup by giving, treating, or managing information on an exceptional event. As a consequence, there is a heterogeneous population of permanent and temporary groups operating in the firm, each group having its own context with its rules, laws and constraints.

3.2. The XYZ firm and its environment

Linkages with the outside are numerous and the diversity of information sources is essential. Purchasing news represents close to 80% of the total budget of the firm, and thus collecting news represents an important challenges that necessitates a number of interaction between XYZ and groups in its environment, temporary groups could emerge by putting together actors of XYZ and actors from the environment of XYZ. Thus, the boundary between the social groups and their environments is porous (as is the boundary between XYZ and the outside).

The editorial team is also connected to dozens of free lance journalists and international agencies (belonging to the firm environment). Newspapers sell as much information as they buy and networking – creating webs of contacts (i.e. social networks) in order to trade information – is the most fundamental aspect of
the work of senior managers. Thus, there is a dense information exchange between internal actors and the external groups acting as sources of information, groups evolving like communities in a set of interrelated social networks. As a consequence, producing the newspapers is a mixture of formally organized processes (the permanent groups) and of a multitude of actions taken by actors who know each other very well and possess the crucial knowledge about the process of creation of the papers and about their readership (temporary groups).

In terms of context, information management depends on two types of context, namely a global shared context associated with the history of the firm, the social networks more or less activated, and a set of local shared contexts associated with local interaction between actors.

**3.3. ICT and communication in the XYZ firm**

The degree of centralization of an organization also has a potential effect on organizational communication. The need for feed-back or communication would be smaller in organizations where power is concentrated at the top of the hierarchy since subordinates are only implementing decisions and do not take part in the shaping of these decisions. Centralization implies a better management of the shared context and thus of the group work.

The communication network of the firm is continuously shaped and re-shaped by current events in the news and in the life of the firm. With the introduction of new information technology, the key decision making processes of the firm was drastically reshaped around the concept of openness of all management offices and reflected the extent to which managers and staff rely on informal communication. Openness is a way to increase the shared context by letting each member to know what the other members are doing.

With the new ICT, the workspace in which groups interact presents an extended openness by the electronic infrastructure that (1) provides a support for the context of their interaction, (2) leads to assimilate each group to an independent virtual community and (3) provides a platform for the management of the most costly resource of the firm: news items and pictures. The improvement of the communication channels speeds up information management because there was less need to check and rebuild the shared context by the new centralized control (and thus less conflict) in the hand a high cohesive editorial group.

The ICT also extends inter-group communication in the organization, facilitates their access to a greater variety of sources of information, provides more time for negotiation and more available material. With the volume of information captured, opportunities for an enlargement of the role of ICT in supporting the emergent sharing of information and the emergent communication between actors increase as well. Groupware will then come to play a core role in this organization and become
the cement that glues the firm together (in the terms of previous findings in small group research).

In terms of context, new groups appear in XYZ and the notion of shared context (and its management) must be considered more at the level of the organization than the temporary groups. This is ascribed in the realm of the organizational memory and a point is to find a way to capture the shared contexts of temporary groups to put them in the enterprise context, which thus will become later a shared context of reference.

3.4. Changes in work practices after ICT introduction

The XYZ firm appears then as a community where members constitute groups that interact. The extension of the group work dimension to the whole firm allows to identify permanent and temporary groups. Permanent groups (editorial team, sales team, finance team, etc.) are the organizational entities at the community level. Some of them, such as the editorial team and the compositor team, act as communities of practice. However, actors in XYZ may belong temporarily to a work group that emerges for solving a specific problem because ties exist at the level of individuals. For example, a witness of an accident or the responsible for an exhibition will phone to a known reporter or editorial member. Temporary groups are created in an ad hoc way.

Permanent groups are observed either inside the firm (e.g. the editorial group) or outside the firm (e.g. other news firms). Some permanent groups, such as freelances, may have a status of social networks only. Temporary groups (or ad-hoc groups) meet actors coming from the firm (generally from a permanent group) and/or from outside the firm. Temporary groups have not the same goals and structures of the permanent groups (they are invested of a mission) and thus must be considered at the specific level of their mission, not the community level. This distinction is detailed in reference to a 4-level model with a people level, an organization level, a community level and an adhocracy level in (Gachet and Brézillon, this issue).

The collaborative aspect of the ICT process rests on an electronic diary of current events that can be accessed and updated by everyone in the team. The diary is at the core of the group process where the editors attempt to guess what will be of most interest to the public. This diary is used such as a focus of attention for actors on what is going on in the world and helps them get ideas for the contents of the paper. The events in the diary are also used as “hooks” on which to hang news items for special focuses of interest. Indeed according to the nature of the event (usual event, specialized event or unpredicted event), the diary will be a reason for the social network, a focus of attention or interest for a community or a mission for a temporary group.
However, contextual knowledge can constrain this decisional process based on the electronic diary. For example, Adam (Adam et al., 2004) describe how one editor recalled: "I was driving back to the newspaper and I got stuck in a big traffic jam. It was the procession for the ordination of the new Bishop for Cork and Ross. At the meeting, I told the lads: “there were so many people! We must put the new Bishop on the front page, people will be interested in that!” This illustrates the strong connection between a focus of attention and its context. Here, first the editor blocks in the traffic jam uses this proceduralized context as a contextual cue in the following with the other editor, introduces this contextual knowledge in the shared context of the editorial team. The contextual knowledge at the editorial-team level is transformed (say by a production rule) as the action to classify in first the information on the new Bishop in the electronic diary.

With the new ICT, hierarchical organization of XYZ has been deeply transformed into a more flexible (dynamic) organization by allowing the reliance on temporary groupings that last as long as the specific problems they tackle exist. Another effect of the ICT introduction is to reinforce ties between actors in all the organization and thus transform it into a community with a texture becoming increasingly dense facilitating collaboration and restricting conflict sources between groups, and between actors in side groups.

The development of a group with a dense texture in a social network is obtained, thanks to a shift of the development of a shared context from the actor level to the organization level, developing in this way a real collective and organizational memory. Going back to the view on context we have presented at the beginning of this paper and along the model proposed in (Gachet and Brezillon, this issue), the construction of the proceduralized contexts by work groups at the adhocracy level allows to develop a shared context first at the community level from where are coming the work groups and, second, at the organization level where the firm exists as a social network.

4. Some aspects of context

4.1. Lessons learned in the case study

It is important to acquire the information and its context for a correct understanding of the information. Information and its context must be considered jointly because the information takes a meaning within its context, and, conversely, this context is identified with respect to the information.

Actors can share contextual elements of their individual contexts to build collaboratively a proceduralized context for the solution in the interaction context. Sharing elements does not mean to develop an identical view of the solution for all
actors, but to make compatible actors' views on the solution (Karsenty and Brézillon, 1995).

An enterprise, such as the XYZ firm, is assimilated to a social network, the discriminating factor being to belong or not to the XYZ firm. However, the frontier between the social network (i.e. the XYZ firm) and its environment is porous, unpredictable events occurring generally outside the XYZ firm. An external event triggers an information management process in several successive steps. At each step of this process there is a particular focus with its context and thus a working group is organized like a virtual community for addressing this particular focus.

Although we speak about the context of the current focus, there are different contexts that are associated with elements such as the social network, the virtual communities, the actors, the enterprise, etc. These contexts can be organized in a hierarchy based on the granularity of the contexts such as presented in Figure 3. In the example of the XYZ firm, the information process management relies on such a context hierarchy because each context is associated with a particular focus.

Another lessons learned from the case study is at the level of each context. Let’s consider the context of a working group. Its context (as for other contexts) presents two aspects depending on an internal or external viewpoint. From an internal viewpoint, this “group context” contains contextual knowledge such as the general policies, roles and tasks to accomplish, rules, constraints, objectives. This contextual knowledge is proceduralized for the given focus of attention in strategies applicable by the actors (within their "individual contexts") participating in the working group. From an external viewpoint, the working group interacts with other entities and thus the group context can be considered as an "individual context" in a larger group (e.g. a market, a European project, etc.) in which proceduralized contexts are built from contextual knowledge of the larger group.

4.2. Context granularity

As said previously, information circulates across contexts. At a general level, we distinguish the group context, the individual contexts of the actors at an intermediate level, and at the more specific level, the context of the focus of attention that corresponds to the interaction context in which actors are working collaboratively. Figure 3 shows the situation for the XYZ firm where the focus of attention corresponds to the project realization (and associated with the project context).
According to our definition of context, the contextual knowledge at one level is transformed into a proceduralized context at the more specific level. For example, contextual information of the group context could be "find a compromise between a relevant information for the readers of the newspaper and the notoriety of the sponsors of the newspaper." This contextual knowledge in the group context will be interpreted at the individual contexts of the actors writing the article in a proceduralized context to give the information, say, without links with the sponsors.

With respect to the notion of social network, context intervenes as intertwined mainly with the virtual community, because the proceduralized context is built in a collaborative way by the actors of the virtual community that share a common focus of attention. The focus of attention leads to the construction of a proceduralized context at each step of its evolution. The saving of the proceduralized context in each actor’s context implies that there is a shared part of the individual contexts developed progressively among actors. The shared context is developed along actors' interaction in the virtual community during the construction of the proceduralized context. As a consequence, actors develop ties during this construction of the proceduralized context.

The development of a robust shared context allows to avoid conflict inside the group. However, if actors have a tendency to align their individual context to the shared context of the group, these individual contexts cannot be considered as part of the shared context. Collaboration in creating the newspaper does not mean sharing linkages with key sources. For example, the “address book” of each editor or
assistant editor is their private asset to a certain extent and the management of this key organizational knowledge escapes any form of central control. As a consequence, the only way to manage the overall company’s address book is to get (and keep) the proper mix of people (i.e. permanent groups as well as temporary group) in an organization close to a community while the networking activity is primarily individual and contacts provide information to their usual source, not to anyone indiscriminately.

Another key consequence of the ICT implementation has been the shift in power and control over the process of production of the newspapers and a new distribution of roles among the groups of the organization. For example, up to 1994, compositors constituted a group of 80 individuals (a kind of community of practice) with a strong cohesiveness internally (reinforced by a structure of clique and a unit of location facilitating face-to-face interactions) which give them a crucial role in the decision making process (the focus of attention) at the organization level. Such a group possessing a unique and crucial expertise (their group context was like an individual context in the arena of the firm) created uncertainty for the groups both below and above it in the hierarchy. As a consequence, this weakened the editorial group and created uncertainty for top management. With the new ICT, the composition room was eliminated by allowing the editorial group to compose directly the newspapers, recentering the leadership in one group at the organization level.

The presentation of a virtual community through its focus of attention and the related context, the proceduralized context that is built, and the ties evolution that results, leads to speak of “contextualization of a social network” rather than virtual community.

4.3. Interaction context and proceduralized-context construction

When an unexpected event occurs, a focus of attention appears in a given context. Both focus and its context have to be considered jointly. Focus and context could concern a group of actors in a social network that have a same concern for the focus and are sensible to its context, and thus will interpret the focus with respect to this context. Linked to the focus and its context, there is an organization of tasks to accomplish and of roles that actors of the group have to play. The actor group becomes assembled, organized and structured like a virtual community and thus will be able to realize a real collaborative work.

The transformation of contextual knowledge in a proceduralized context supposes a process of communication between different levels. Figure 4 represents how the proceduralized context (PC) is built from contextual knowledge (CK) and (EK) represents external knowledge in individual contexts of two (or more) actors during their interaction about the given focus of attention. The interaction context contains the pieces of contextual knowledge put by each actor (i.e. from their individual contexts) in the interaction context to make them visible and shared with
other actors, and finally assembled and structured jointly by all the actors during their interaction to constitute the proceduralized context needs at the given focus of attention. Thus, the proceduralized context is the result of a co-construction by the actors of a virtual community. Once the proceduralized context has been exploited at the current focus of attention, it becomes a piece of actors' shared contextual knowledge. A discussion on this aspect of context can be found in (Brézillon, 2003b).

Ties are managed at different levels between the actors of the virtual community during this proceduralized-context construction until its final movement into their shared contextual knowledge.

![Diagram](image.png)

**Figure 4.** A representation of the proceduralized-context construction

### 4.4. A context-based view of social networks

From previous sections, virtual communities are contextualizations of a social network, with (1) contextualization resulting of the focus-dependent reinforcement of ties among groups of actors and (2) ties reinforcement being developed during the proceduralized-context construction.
This leads to a parallel between both views on context and on social network. Figure 5 presents a situation for a social network and virtual community (virtual communities are represented distinctly from the original social network only for making more readable the comparison) similar to the situation described in Figure 3 for the different types of context. The more the granularity is small, the more the entity is organized and structured. Thus, a proceduralized context (respectively a virtual community) has a higher organization than a body of contextual knowledge (respectively the social network).

Another parallel between the pairs (contextual knowledge, proceduralized context) and (social network, virtual community) is the following. In both cases, what are unstructured elements (contextual knowledge and actors) become at the upper level a chunk of knowledge (a proceduralized context) and a "chunk of actors" (a virtual community). Table 1 gives the parallel between the discussions on context and on social networks.

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<tr>
<th>Contextual knowledge</th>
<th>Social network</th>
<th>Unstructured</th>
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<tbody>
<tr>
<td>External knowledge</td>
<td>Environment</td>
<td>Unstructured</td>
</tr>
<tr>
<td>Proceduralized context (PC)</td>
<td>Virtual community</td>
<td>Structured</td>
</tr>
<tr>
<td>PC building</td>
<td>Tie reinforcement</td>
<td>Contextualization process</td>
</tr>
<tr>
<td>Chunk of knowledge</td>
<td>Chunk of actors</td>
<td>Operational knowledge</td>
</tr>
</tbody>
</table>
Table 1. Parallels between context and social networks

5. Conclusion and perspectives

Until now studies on collaborative work, context, social network, virtual community have been lead separately with any cross-references. In this paper we show that context plays a central role in order to, on the one hand, give a global and coherent view on social network and virtual community, and, on the other hand, replace collaborative work in a new framework providing a new insight on interrelationships between participants (all coming from a same social network): creating ties being equivalent to build a proceduralized context and the development of a large shared context. This new insight on collaborative work comes from the choice to consider an enterprise as a structure of information fluxes. This leads to a problem of knowledge management, in which the important point is the management of all the transitions between all the different states of the knowledge such as tacit, implicit, individual, collective, etc. (Prax, 2001). The integration of knowledge management, context management and context management seems to be a new challenge in collaborative work.

A virtual community has a life cycle wit a birth, a life and an end, which is shorter than the life cycle of the social network. Maybe the most interesting difference between a social network and a virtual community is that the virtual community can be compared to a dissipative structure as discussed some times ago in the living system area (Prigogine, 1967), i.e. a structure that maintains an organization using the flux of energy (the information) that crosses it.

We introduce the notion of "chunk of actors" to lead a parallel with the notion of chunk of knowledge a la Schank (1982) and point out a dynamic dimension to collaborative work apparently not considered explicitly before. Moreover, context can be related to virtual community because the latter results of a process of contextualization in a social network corresponding to the expression "chunk of actors."

Even in the unique domain of social network and virtual community, the view presented in this paper is a challenge. First, the view of a virtual community as a contextualization of a social network to address a given focus of attention is not usual in the literature. This is shown in another domain (Brézillon, 2003a) with practices representing contextualizations of the procedures established by the enterprise in order to address the specificity of the contextual cues of the situation (the focus of attention). Second, the evolution of a focus of attention is described as a series of contextualizations of a social network for dealing with different steps of the global focus of attention. Three, a large project (e.g. a European project) can lead simultaneously to the birth of several virtual communities acting in parallel on parts of the problem to solve (e.g. the work packages).
6. References


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2001 (last visit: 01/12/04)


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