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Program Committee

Palette
Pedagogically sustained Adaptive Learning through the Exploitation of Tacit and Explicit Knowledge

EIAH 2007: International Workshop on June 26, 2007

Learning and working in CoPs: theoretical and technological issues

Apprendre et travailler dans les CoPs: enjeux théoriques et technologiques

Programme

09:00 – 09:15
Welcome – Accueil

09:15 – 10:15
Invited talk – Conférence invitée Chair: B. Charlier

- **Considering the idea of practice in learning through CoPs**
  Murray Saunders, CSET, Lancaster University

10:15 – 10:45
Coffee Break – Pause Café

10:45 – 12:15

Session 1: Learning in CoPS, theoretical issues – Apprendre dans les CoPs, enjeux théoriques Chair: Lilliane Esnault

- **Variation in conceptions of "Communities of Practice" and its implication for research and development**
  P. Ashwin, B. Charlier, A. Daele and M. Saunders

- **An Activity Perspective on Reification Processes in Distributed Communities of Practice. Implications for on-line tools design**
  R. Zeiliger and L. Esnault

- **Modelling activity and development of communities of practices**
  M. Kuenzel, B. Charlier and A. Daele

- **FORM@HETICE : Une étude de cas sous l'angle de la théorie des Communautés de Pratique (Short Paper)**
  Arnaud Milstein et Brigitte Denis

12h 30
Lunch break – Pause repas

14:00 - 15:30

Session 2: Learning in CoPS, technological issues - Apprendre dans les CoPs, enjeux technologiques issues Chair: Christine Vanoirbeek

- **Instrumentation d'une communauté de pratique virtuelle: illustration avec le portail TE-Cap**
  E. Garrot et S. George

- **Incremental formalization of argumentative collaboration**
  N. Karacapilidis and M. Tzagarakis

- **Exploring the selection of technology for enabling the CoPs development (Short paper)**
  D. Gorga

15:30 – 16:00
Coffee Break – Pause Café

16:00 - 17:00

Session 3 – Panel: **A le recherche de méthodes pour comprendre l'apprentissage et le developpement des CoPs** Chair: France Henri

Caroline Brassard, *Universités du Québec à Montréal et de Chicoutimi*, Amaury Daele, *Université de Fribourg*, Nathalie Deschryver*, Universités de Genève et de Fribourg*, Mélanie Ciussi- Boss, *Université d'Aix en Provence.*

17:00 - 17:30

Closing Session – Session de cloture Chair: M. Saunders and D. Gillet

Open Discussion and summary of the day's progress – Future steps

*** Atelier bilingue – bilingual workshop. La langue du titre de la communication correspond à la langue utilisée pour celle-ci. The title indicates the language used for the communication.**

Sommaire

Variation in conceptions of « communities of practice » and its implication for research and development

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ABSTRACT. *The notion of « Communities of Practice" (CoP) is an increasingly popular one in informing educational research and development and has been used to inform the work of the PALETTE Project. In this paper, we will give an initial introduction to the ideas behind CoPs and outline the particular conceptualisation of CoPs that has informed the initial design of the PALETTE project. We will then show that in the research literature in this area, they have been different emphases on the constituent parts that make up a CoP. Using the Doctoral Programme in Educational Research at Lancaster University as an example of a CoP, we will argue that these different emphases lead to different approaches to researching and supporting the professional development of CoPs and thus an awareness of the different ways in which CoPs are understood by researchers, developers and members of CoPs, is vital if international collaborative research and development projects such as PALETTE are to be successful in meeting their aims.*

KEYWORDS: *Communities of Practice, professional development, collaborative research*

1. Introduction

In this paper, we will focus on how different conceptions of the notion of 'Communities of Practice' (CoPs) impact on attempts to undertake research and professional development within CoPs. By 'conception' we mean a particular way of thinking about a phenomenon, in this case CoPs that informs actors' approaches to engaging with that phenomenon.

In order to make progress on this discussion, we would like to propose that the idea of a community of practice is part of a theory on the way 'practice' itself yields knowledge and learning. This narrative turns to a consideration of the learning process but does so by figuring the locus of concern as learning in social or organisational contexts rather than individual cognitive process.

The idea of a CoP analyses an extended notion of professional and organisational knowledge, produced and sustained through situated working practice. However, it might be extended to include groups who come together to engage in purposeful action from different working or social environments thus forming a new group with its own set of practices (individuals in an interest group, a 'hobby group', a group of learners on a course etc). The approach integrates theories that explore professional learning process (see Eraut 2000, Schon 1991) with those that develop the idea of 'practice' itself (Giddens 1976, Lave and Wenger 1991, Wenger 1998 and 2000). It also implies a concept of the knowledge resources (this is understood very broadly to encompass formal, explicit and technical knowledge on the one hand and informal, tacit, social, cultural and discursive knowledge on the other) that are produced and accessed, metaphorically as 'rules' through practice. Knowledge resources in this sense, frame our group behaviour in working or learning environments (Blackler 1995, Bereiter and Scardamalia 1993). This approach has broken new ground and provides a fertile opportunity for new research into the way learning and work intersect and the way in which groups learn together. It has a corpus of theory that depicts the new entrant or novice in a social group as travelling through a cyclical journey of practice (the notion of 'practice' defined in the work of Giddens (1976) as 'routine rule governed behaviour' is helpful in understanding the way a CoP is composed of clusters of practices). By working and learning in a CoP, members are accessing and producing new knowledge (as knowledge resources that provide frameworks for action or rules) through both informal and formal learning processes. This process creates continually evolving clusters of practices. As these cycles proceed, the novice moves from the periphery to the centre in terms of experience and expertise.

The important dimension of this theoretical orientation is the way it involves a complex dynamic. This dynamic is constantly evolving as new members of a community of practice use the knowledge resources that are in place by following tacit and explicit rules but at the same time have the potential to create and add to the knowledge base at others' disposal. This is not to suggest that practice is the only source of knowledge resources but that it has moved to centre stage in our understanding. It is clearly an evocative frame of reference providing the theoretical base for many studies globally in which shared or collaborative learning is the central preoccupation, in professional groups (see for example Hilsdon 2004), in disciplines (see for example Graven 2004), in on-line environments (see for example Dewhurst, McLeod, Ellaway, 2004).

There are two aspects of our understanding of the theoretical underpinning of CoPs that should be emphasized. First, we see the notion of CoPs as *descriptive* rather than

prescriptive, that is we see the notion of CoPs as a way of describing how practices are located within social contexts rather than as a tool for describing how organizations *ought* to approach their practices. Second, we see the notion as potentially applying to all social practices whatever their domain, be they drawn, for example, from commercial organizations, formal educational settings, or informal social networks. Thus our example in this paper is drawn from a formal educational setting but we would see our argument as applicable to the research and development of all CoPs.

2. The notion of CoPs that has informed PALETTE

At his beginning the PALETTE project has referred to Wenger (1998) for defining a Community of Practice (CoP). Such communities are groups of people who share a concern, a set of problems, or a passion about a topic (the *domain* of the community), deepen their practical knowledge and expertise in the area under consideration (the *practice* of the community), and interact on an ongoing basis (the *community* itself).

The relations between the members and their activities are described as following by Wenger, McDermott & Snyder (2002, pp. 4-5):

> "As they spend time together, they typically share information, insight and advice. They help each other solve problems. They discuss their situations, their aspirations and their needs. … They may create tools, standards, generic designs, manuals, and other documents. … Over time, they develop a unique perspective on their topic as well as a body of common knowledge, practices, and approaches. … They may even develop a common sense of identity."

This description refers clearly to the nature of knowledge and learning into such communities. For Wenger and his colleagues, the knowledge of professionals is not independent from the act of doing their practice and enhancing it all along their professional life. This means that knowledge can not be reduced to an object or isolated information. It is dynamic, tacit as well as explicit and social as well as individual.

The relative vagueness of professional knowledge (or professional practice) has been described by Donnay & Charlier (2006). It is:

- not always available for the professional: it is constructed within professional situations which are not necessarily described with words. Practice is embedded in action and often used as routines not analyzed or consciously decided.
- not always accessible for others: it is constructed within specific contexts into a specific vision of the profession. For being accessible, practice has to be processed and decoded.
- not fully conveyed: because not fully verbalized. To specifically translate with words a complex professional action and the professional experience of someone is almost impossible.
- peculiar to each professional: professional practice determines our professional identity all the way through our professional life and within a specific organizational context. In addition, professional practice is also full of emotions and affects.
- not always transferable: it is valid for its author as long as it is efficient in his/her context. The consequence is that professionals tend to generalize their own practices and it is not easy for them to change. However in return, practices are credible for other professionals and could be a part of a collective practice.

These issues concerning professional practice are at the heart of the PALETTE project. The aims are to analyse a particular social phenomenon – sharing and reifying professional practice within a professional community – and to develop technical services in order to support it. The development of these services is lead through a participatory methodology.

3. Different approaches to understanding CoPs in pedagogical research

In the PALETTE project, we are seeking to research CoPs in order to build technical services to support their development as communities of practice. In order to do this, it is clear that there needs to be a shared sense of what a community of practice consists of. As we discussed in the previous section, this shared sense is built around three aspects of CoPs: a shared *domain*, a shared *practice*, and a shared *community*.

However, although these three aspects are incorporated into the existing research into CoPs, different studies place a different aspect at the foreground of their analysis. For example, some researchers focus is on the *community*, element of the community of practice, as Price (2005) does in her consideration of the extent to which module teams in a business school share their tacit knowledge about assessment. Others, for example see Contu and Wilmott (2003), foreground the *practice* element of communities of practice. Finally, others emphasise the discourses that characterise the *domain* of different communities of practice, as Avis *et al* (2002) do in their consideration of the construction of learners in post-compulsory education and training. Each of these examples draws on the notions of community, practice, and domain but in each of these cases a different aspect takes centre stage and is taken as the primary unit of analysis.

The problem is that the differences between the foci of these studies are rarely acknowledged. However, the decision to place the community, the practice, or the domain in the foreground of any analysis of CoPs leads to different approaches to undertaking research and professional development within CoPs. We will illustrate this point by taking the Doctoral Programme in Educational Research at Lancaster University as an example.

4. An example of the impact of different approaches to understanding CoPs

The Doctoral Programme in Educational Research is a programme for practitioners in further and higher education, Department of Educational Research, Lancaster University. These practitioners are drawn from a variety of roles including lecturers, educational developers, e-learning professionals and, although they are mainly based in the UK, are drawn from across the world. This PhD programme involves two years of taught modules (Part 1), which result in the production of work that is of a publishable quality, and two years (Part 2) of researching and writing a 40 - 50,000 word thesis.

If we think about researching and developing this CoP, we can see that foregrounding different aspects of the CoP leads to quite different approaches.

4.1. A focus on the Doctoral Programme community

If we were to foreground the systemic aspects of our CoP, that is to focus on it as a *Community* of practice, then our focus in research would be on how the CoP functions as a

community. For example, we might seek to understand the level of shared understanding that those involved in the CoP have of their tasks and examine the ways in which the CoP seeks to maintain a collective identity and purpose. In developing the CoP we would seek to design interventions that are focused on developing a shared identity and purpose within the community.

4.2. A focus on the practices of the Doctoral Programme

If we were to foreground the practice element of the CoP, then our focus in research would be on how to understand the teaching and learning practices of the students in the CoP. For example, we might seek to understand the way in which different teaching and learning practices relate to the quality of students' learning. Thus our focus would be on how these practices lead to a critical understanding of the subject matter rather than on the students developing a shared understanding of their identity. In developing the CoP, we would seek to design interventions that are focused on improving students' understanding of this subject matter.

4.3. A focus on the discourses of the domain of the Doctoral Programme

If we were to focus on the discourses that inform the domain of our CoP, then our focus in research would be on how teaching and learning interactions position students and tutors in different ways. For example, we might seek to understand how the discourses of discussions in the CoP led to students and tutors being positioned as passive or active and how this impacted on their experience of the teaching and learning environment. In developing the CoP, we would seek to design interventions that are focused on making the discourse explicit so that the CoP could gain a better understanding of how its members were being positioned and examine ways of challenging or changing this discourse.

Thus it is clear that these different foci lead to quite different approaches to the research of CoPs. In the first the focus is on shared identities, in the second it is on ways of improving practices, and the third it is on changing the discourse of the domain. These foci also lead to different type of professional development interventions in relation to the CoPs. In addition, members of the CoPs may have different senses of which of these foci are central to their experience of CoPs. Therefore, without a clear understanding of the different ways in which CoPs are understood by those who practice in, those who develop and those who research them, it is possible that significant misunderstandings can occur that could threaten the success of attempts to develop CoPs. It is the reason why a special task has been dedicated to develop a grid analysis that will support the diagnostic of the needs and vectors of self-development for CoPs. This tool will support the dialog between the actors.

5. Conclusion

In this paper we have shown that even within a shared overview of the idea of communities of practice, an emphasis on different aspects of CoPs can lead to very different ways of researching and developing these communities. In addition, this research and development needs to be aware of the conceptions of these different aspects held by those involved in the CoPs. This suggests that at both the level of an international collaborative research project such as PALETTE, and at the level of our work with individual CoPs, explicit discussions of our different understandings of the relations between the community,

the practice and the domain are vital if we are to be able to take account of the impact of these differing understandings when working together.

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An Activity Perspective on

Reification Processes in Distributed Communities of Practice. Implications for Online Tools Design

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ABSTRACT. *This position paper considers the process of reification in the context of distributed communities of practice whose members get connected through the Internet. It focuses on the process of computerized reification i.e. reifying by constructing symbolic representations with online software tools. The aim of the paper is to explore the perspective brought by considering this process as an activity system in the sense of the Activity Theory, in order to capture some unexpected dimensions of reification. We hypothesize that constructing computerized symbolic representations would be valued by community members not merely for its capacity to create points of focus around which the negotiation of meaning becomes organized (Wenger) but also for its capacity to provide joint activities that compensate for a lack of participation. Over investing the computerized activities would eventually reshape the community. The paper builds on observations of distributed communities of practice of whom the authors are members. Implications for the design of online collaborative software tools and knowledge management tools are envisaged.*

Communities of Practice

1. Introduction

In a first book Wenger (1998) presented communities of practice (CoPs) as group of people where shared practice - considered here as a social production of meaning - is a source of coherence : “practice is about meaning as an experience of everyday life” [Wenger,1998:52]. Communities of practice get organized around a process of “negotiation of meaning” which involves the interaction of two components : “participation” and “reification”. In a second book [Wenger,02] he tackled “the challenge of distributed communities”, insisting mostly on the social and business aspects without acknowledging a possible predominant role of the technologies.

Distributed communities are communities whose members are not co-located and interact through computers. With the development of Internet more communities of practice get distributed. Those communities “have to resort to technologies that are not real substitutes for face-to-face interactions” [Wenger, 02,116]. In distributed CoPs learning through observation, imitation, social participation and shared practice is more difficult than when members attend face-to-face meetings. In distributed CoPs most of the social interaction is mediated by computer-based interactions and computer-supported symbol manipulation tools. Written language for example is mediated by chat, forum, email, while spoken language is supported by teleconference tools like Skype, Netmeeting. Other kind of symbolic representations like maps (concept-map, mind-map, knowledge map) or schemas are also extensively used. In distributed CoPs it is likely that reification – giving form to our experience by producing objects - is shaped by the use of computers, even for the most technically-skilled “reflective practitioner”. As noted by [Nonaka,95] “sharing tacit knowledge takes place through joint activities and requires physical proximity”. But when there is no proximity, community members still participate in joint activities; the difference then is that these activities are computer-based. Can we then say that they share tacit knowledge ? Or do they have to make everything explicit ? Do all explicit representations have then the same status ? How available technologies shape their activities ?

There seem to be an inherent paradox in talking of communities that are founded by the sharing of tacit knowledge while they are not co-located and have to resort exclusively to computer networks. This paradox anchors in the well known and controversial debate about what we call knowledge: “In a computerized system knowledge is articulated and divorced from direct action and becomes a manipulable abstraction” [Jackson,01]. However such communities of practice exist for sure. In this paper we hypothesize that distributed communities joint activities get deeply organised around exchanging symbolic representations and that computerized reification may take a more important place - to the detriment of participation - serving perhaps other purposes that the one pictured by Wenger. We propose to adopt an Activity Theory perspective on distributed CoPs computer-based activities to help investigate this hypothesis.

2. Participation and reification in CoPs.

“Participation refers to a process of taking part and also to the relations with others that

reflect this process" [Wenger,98:54] "it is a complex process that combines doing, talking, thinking, feeling and belonging". In short participation is action plus relation or relation constructed in the context of an activity. Participation is a source of identity. Identity is constructed relatively to the community and is a motor for learning.

Reification is "giving form to our experience by producing objects (…) In so doing we create points of focus around which the negotiation of meaning becomes organized (…) reification in CoPs covers a wide range of processes that include … representing, naming, encoding (…) as well as perceiving, using ….in all these cases aspects of human experience and practice are congealed into fixed forms and given the status of object" [Wenger,98]. Building symbolic representations with a computer is a reification process.

The negotiation of meaning which is central to CoPs "weaves participation and reification to secure some continuity of meaning across time and space" [Wenger, 98:63] : there are "misalignments" inherent in participation as well as in reification that can be repaired and get compensated so that participation and reification form a duality and not an opposition. They shape each other. In some situations some imbalance may occur and we would argue this is likely to be the case with distributed CoPs. Wenger has foreseen this situation : "participation and reification are two channels of power available to participants" [Wenger,98:91], but he tend to explain it in terms of politics rather than in terms of "social frustration and tool addiction".

3. Participation and reification in distributed CoPs : a few hypothesis.

The main hypothesis that will be discussed here is that distributed communities members suffer a lack of participation which they compensate by concentrating on the reification activity: the lack of participation is primarily a lack of action due to the difficulty for isolated members to **engage in joint activities**. Joint activities usually provide opportunities for building inter-personal relations. Isolated members who are deprived of joint activities have difficulties to build inter-personal relations. In distributed CoPs community members "need to devote much more time to (…) building personal relationships" [Wenger,02 :120]. We hypothesize that i) reification is then over invested to compensate this imbalance, ii) over reification is also shaped and driven by computer use. Within the Activity Theory (AT) framework, reification can be viewed as an activity system i.e. a group of people that interact with tools over time with a shared motive. We think that AT may help investigate such hypothesis.

Because the members of distributed CoPs are isolated it is likely that they engage in *individual* activities more often than in *joint* activities. In distributed communities joint activities get mediated by technologies that require efforts, specific skills, very efficient tools with probably less outcomes in term of inter-personal relations. Members that seldom meet in the real world are also likely to have more difficulties to organize their work, including organizing virtual meetings. However the community would not exist without interaction between its members and activity theory stresses that social activities are the necessary framework where inter-personal relations may be built in the course of the process of negotiation of meaning. So the members of distributed communities – of course – still

engage in joint activities : chat, forum, tele-conferences, "e-places" and other tools abound that support "**virtual joint activities**". Despite the efforts deployed by these systems to improve interaction and awareness it is known that such virtual activities cannot support the same level of participation that can be expected in real world meetings. There are exceptions and well known advantages in virtual networking, but it is usually recognized that "access to technology can be a barrier to communication". Person-to-person interactions through computers have not the directedness of face-to-face meetings (there are some exceptions) and they require more skills and practice in human-computer interaction (HCI). Moreover "most technologies remain focussed on the sharing of abstracted, harder aspects of knowledge in the form of reports and documents" [Kimble,02].

In the process of mastering the computer tool, members surely develop a **practice of computer use** that eventually may - in their preoccupations - take the place originally dedicated to the practice around which the community was structured. The original practice that founded the community and the practice of computers may intermix over time. Except in specific cases (where the tools are identical) these practices are deeply different: individual work and interactions through computers take the form of exchanging symbolic representations while original practices are mediated by a great variety of tools and allow for direct experience sharing: trust building for example is conveyed by attitudes, gestures, behaviour that do not translate well with online tools.

Let us take the example of a distributed community of practice focussed on ski mountaineering (there are a lot of them). Let say that they have very few occasions to directly share their practice (skiing together): the original practice (skiing) is mediated by the ski equipment and is deeply contingent of the environment (mountains and weather), while the community interactions are mediated by computer forum and data-bases (or other computer tools). Such communities of practice have a lot of active members and are very meaningful: they do create knowledge. Community members develop both the ski practice and the computer practice over time. Their community is structured around sharing the practice of skiing, but they tend to share also computer practices and to adopt new behaviours that are shaped by the computer technology that supports their network: yes, in these communities computers do influence the practice of skiing !

What we are willing to discuss here is : what are the consequences of this dual situation on the processes of learning, identity, participation and reification emphasized by Wenger. In this position paper we will not go beyond mentioning a few research ideas and reflections. Further investigation is of course strongly required.

About distributed communities :

- In distributed communities there is little opportunity for sharing experience and negotiate meaning interactively.
- In such distributed communities the original practice and the computer practice form a duality: each one shape the other.
- In such communities participation (in Wenger sense) is low. Establishing social relations is difficult and tend to develop through the production of reifications.
- In such communities the members are in relation with computer tools before than being in relation with other members. The relation with the computer tools is a

source of identity and a passage toward social relations.

- Because of a certain personalization of computers, human-computer interaction "takes on more and more traits of joint activity" [Tikhomirov,99:357], to the detriment of community "real" joint activities.

About over reification in distributed communities :

- In such communities there is an imbalance between individual activities and joint activities which leads to an over reification process. It causes an imbalance between participation and reification whose consequence is a difficulty to achieve "mutual recognition".
- Over reification is also caused by the distribution of members locations and the need to explicit elements of the local context that otherwise would remain hidden.
- Reification in distributed communities may have a more social purpose than in traditional communities.
- Excessive reification is still intended to "focussing the negotiation of meaning", but when combined with an imbalance of participation it may eventually lead to an illusion of negotiation. Reification cannot "become a substitute for a deep understanding of and what it stands for".
- Computer-based reification activities are often the only joint activities that are available. Reification is a pretext for joint activities whose main purpose is increasing participation.
- Reification is used as a placeholder to participation *(a token* that substitutes to real participation).
- "Reifications are always potentially enriching and potentially misleading". They require interpretation in a context and the context may be lost in distributed communities. "Participation is essential to repairing the potential misalignments inherent in reification" [Wenger, 98, 64].
- An important percentage of reifications cannot be interpreted in term of externalizing experience and thus cannot be exploited by knowledge management.
- In the wording of Actor Network Theory we would say that some reifications could be interpreted as inscriptions targeted at translating the members interests.

About the role of computers and computer-based activities in over reification:

- Reification is often centred on aspects of the computer experience rather than on elements of the discussed domain.
- Over reification also finds its roots in the appeal and extensive use of computers.
- We may have a phenomena we would call : "the computerization of reifications". Psychological effects of computerization include "a transformation () of stable meanings of personality and personality's goals" [Tikhomirov, 99:353]. Hypertrust, invasive computer-specific goals are among the negative effects.

- Because of the over reification process there is an excessive focus on computerized interaction tools.
- It is known that reifications cannot "capture in their form the practice in context". Computer based reifications cannot either, but they may convey an illusion that they are more able to do so (a computer provisional representation is "*more hard"* than its equivalent paper draft). Computer reifications may easily convey the idea that meanings are in the artefacts themselves.
- A known drawback in CSCW is that a lot of things that were implicit in presential work have to be made explicit. Computer based explicitation although necessary, may become an habit, even an addiction. "Recently there has been a trend towards recognising that there are some aspects of knowledge (..) which cannot be articulated, abstracted, codified, captured and stored" [Kimble,02]. What we want to stress here is that there is a danger for communities centred on practice in over investing symbolic representations which are "*systems from which the human actor has been removed*".

We will now adopt an Activity Theory perspective for analysing the computer-based reification activity in distributed CoPs.

4. An Activity Theory perspective on computer-based reifications in distributed communities of practice.

1- The Activity theory framework

"Activity theory (AT) is a commonly accepted name for a line of theorizing and research initiated by the founders of the cultural-historical school of Russian psychology, Vygotsky, Leont'ev, Luria, in the 1920s and 1930s" [Engestrom, Miettinen, p1]. Over the 15 past years the Activity Theory ideas had an increased impact on such fields as learning, human – computer interaction, distributed cognition and theories of practice. The basic principles that are constitutive of the Activity Theory conceptual system and that are relevant to the issues discussed here are: the principle of unity of consciousness and activity, the principle of object oriented-ness of activity, the duality of internalization and externalization processes, the principle of tool mediation, and the hierarchical structure of activity. We shall not recall those principles with more details here : a summary may be found in [Kaptelinin, Kuutti, Bannon, 1995].

Activity theory and Wenger's theory of learning as a social participation in communities are consistent: the idea that "practice is first and foremost, a process by which we can experience the world and our engagement with it as meaningful" [Wenger,98, 51] matches very well the AT idea that our relation with the world is mediated by activity, that activity and consciousness are united. When Wenger says that "reification shapes our experience" he is consistent with the internalization/externalization principle. When he says that " a good tool can reify an activity" he agrees with the tool mediation principle. The social theory of learning pictured by Wenger fits with Russell view of learning "as expanding involvement – social as intellectual – with some activity system over time" [Russel,02]. The role of technology – in particular ICT - which is framed by Vygotsky tool mediation principle, may have been underestimated by Wenger. Some Activity Theory proponents like Tikhomirov insist on the "psychological effects of computerization". Some effects like "a transformation

in the whole system of motives, stable meanings of personality, and personality's goal" [Tikhomurov,99:353] may be relevant to the study of distributed communities.

We shall now use some of those principles to investigate the hypothesis of distributed CoPs over-reification activity. In the discussion that follows we now use the term "**activity**" with reference to Leontiev's model of activity structure.

An Activity Theory perspective on reification in distributed CoPs. Distributed CoPs members have a domain of activity (professional or not) where their practice is developed; some computer-based joint activities through which they interact with other community members, an individual (external) activity and a mental activity (internal, reflexive) related to the practice of the community to which they belong. Roughly, what AT can teach us is : that each one of these activities is driven by a purpose (principle of object-oriented-ness), each activity has a goal-oriented level of actions and a contingency-driven level of operations where computer is a mediating tool: computer practice changes the range of the external activities (the domain one and the community one as well) which in turn shape the community members mental activity (internalization/externalization loop).

Adopting the framework of Activity Theory, the structure of the computerized reification activity of virtual communities members could be viewed as follows :

- operations (contingent upon the computer environment) = operations on computers, manipulating symbolic representationsusing online tools features.
- actions (directed to a goal)= constructing symbolic representations (text or graphical)Directed to one of these goals :

a) externalizing self thought (mind mapping).

b) interacting with remote members (ex shared editing, joint navigation, …).

c) preparing points of focus for negotiating meaning with others (drafting).

d) practising the tools.

e) fulfilling a need for action.

f) externalizing tacit knowledge.

- activity (directed by a motive)

a) political : commitment to action is motivated by acquiring power within the community.

b) identitary : acting is valued because it is viewed as a source of identity

c) enactional : acting is motivated by an appealing tool.

d) relational : action is a pretext for working with others.

e) asset management : acting is targeted at capitalizing codified knowledge.

With this 3-levels structure, what Activity Theory brings to this perspective on isolated members activity is :

- a clear distinction between action – which translate to an observable behaviour , and activity - which is directed to an unobservable motive: building a single symbolic representation (a single goal) may be interpreted in terms of very different motives.
- a clear distinction between the actions (directed to a goal) and the operations both constrained and driven by the computerized tools. It is important to recall the flexibility of this structure overtime [Leontiev,72]: an unsuccessful operation may become a conscious action. For example, the mastering of a difficult computer tool may become a conscious goal, one of the pervasive computer-related goals mentioned above. On the contrary an appealing tool may trigger an enactional behaviour that blur the initial goal.
- Distributed CoPs get shaped by computer practice in so far that computer networks amplify the motives mentioned above.

Reification : activity, consciousness and knowledge.

"The object of knowledge is practical in the sense that it depends upon a specific kind of practice for its existence" [Dewey]. It makes sense then to say that communities of practice do create knowledge. However tacit (soft) knowledge is hard to formalize because "it is - in Polanyi's terms - knowledge that is not at the forefront of consciousness [Polanyi,67, coined by Kimble,02]. Precisely, according to AT, activity is what mediate our relation to the "real world" [Nardi,96]. What we learn here is that even for the most "reflective practitioner" it is only **in the course of activities** that the forefront of consciousness may move so that tacit knowledge can become explicit. Codifying explicit knowledge comes second only: consciousness comes first. For that reason it is of prime importance that community members participate in activities – joint as well as individual; and it is important that online services promote activity, even before offering knowledge management services. This is where over reification fits in: we said that it may be interpreted at first as resulting from a frustrating lack of possibilities for action; but it may also evolve toward an **opportunity for activities,** on one condition however: that the support tools do not exclusively consider it as directly aimed at constructing codified knowledge. In other words supporting knowledge creation resorts mainly to supporting the activities in the course of which knowledge may eventually be externalised.

5. Implications for distributed CoPs tool design.

The hypothesis proposed above certainly requires further investigation. In this position paper we begin envisaging the outcomes it has in terms of designing online services for distributed CoPs.

- Reification software should provide an affordance (ability) for activity i.e. they should tend to engage users into **individual and joint activities**. What we want to

stress here is that they should not merely facilitate operations (in the sense of AT) in being usable. They should promote action, they should appeal to the community members so that they commit into more activity. In short they have to promote **constructivism**. Direct manipulation through drag and drop operations, sketching, mind mapping tools are good examples.

- Reification services should support the passage from individual to joint activity and vv. They should not focus on finalized representations to the detriment of negotiable representations. They have to provide a free space (both in the concrete and abstract sense) for interaction and negotiation: graphical representations (maps or schemas) which have a loose structure are good because several participants may share the "screen real estate" for expressing their views.
- If we accept the hypothesis discussed here, we cannot consider that all computer reifications are explicit representations of tacit knowledge, nor that they even contain symbols referring systematically to objects in the world. Such reifications find their consistency in the intent of their authors, which remains largely inaccessible to computers. Reification services should not impose a logical consistency, nor build some processing on it. Hybrid representations are welcome.
- However reification online services should facilitate a possible evolution of the constructs toward representations consistent with knowledge management. This is called "incremental formalization".

6. Conclusion

"If one simply looks at the manipulation of symbols, one is purely at the level of information theory. In contrast, Activity Theory (…) deals with the thought processes that occur among group members as they carry out activities that involve the mutual manipulation of these symbols and the mutual negotiation of their meaning" [Sherry, Myers, 98]. We have proposed that what distributed community members have in mind, their motives for engaging in symbol manipulation activities may go far beyond the aim of expliciting some tacit knowledge related to their experience in practice. Their motives may be political, identitary, enactional, relational, as well of course as truly aimed at producing knowledge assets. A given reification may serve mixed purposes. Our attributing of such motives to distributed CoP's members - although based on observations - certainly requires a deeper investigation. In the meantime we propose as a precaution that the design of online services targeted at supporting the activities of community members should not assume that all computerized reifications are a *sort of knowledge*. Designing services that can support joint activities driven by other motives should be also a concern.

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Modelling activity and development of communities of practice

Conférence EIAH 2007 (Environnements Informatiques pour l'Apprentissage Humain)

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1. Abstract

This paper aims at designing a model that depicts the activities and the issues of development of a Community of Practice (CoP). It particularly addresses consultants and facilitators who are asked to support CoPs throughout their life cycle. After a literature review, the authors describe their exploratory study on several CoPs involved in different domains of activity. Five groups of CoPs activities (management, social, project-oriented, small actions and metacognitive) and three activity patterns are proposed in a model in order to distinguish different types of CoPs from the point of view of their development. Then the CoPs observed throughout the study are classified in different types following their preferential activity and objectives. Finally, further reflections are proposed for the support of CoPs activities as well as for the development of suitable technical services for CoPs.

KEYWORDS : *Communities of Practice, activity, metacognition, model, development*

Environnements Informatiques pour l'Apprentissage Humain, Lausanne 2007

2. Introduction

In the context of a European research and development project, the PALETTE project [Palette 07], we are looking for a community of practice (CoP) model that helps consultants and facilitators to grasp the situation in the community and estimate how the community will go on to develop. We have found important prompts in research and publication concerning CoPs, but not the model we are looking for. So we decided to build a model upon our own research on communities.

Research and publication concerning CoPs looks for instance at the participation in communities [Fuller et al. 05], how they operate online [Bourhis et al. 05], how they build and share knowledge [Klein et al. 05] what contribution they make to knowledge management [Hew & Hara 06] and how they are integrated in operations [Bate & Robert 02]. The PALETTE research project asks similar questions. Among other things, we are examining what effects jointly developed visions, work scenarios and Web services have on the development of CoPs. However, adopting an intervention approach of research, we will have to wait a little while for processed results bearing the status of scientific concepts and theories.

Others attempts to understand the phenomenon of CoPs in conceptual and definitional terms [Garrety et al. 04]. They struggle with the difficulty that CoPs, being a social phenomenon, undergo continuous development [Cox 05] and do not conform with conventions. The research today is no longer for a definition of CoPs which is as specific or comprehensive as possible, but rather a sophisticated conceptualisation [Dubé et al. 06] providing statements on what types of CoPs there are, what common features, needs and goals they have, and how they get there. Palette will also be able to make contributions to this.

This work with still just a few dozen communities but organized in professional activity domains is a step in that direction. We want to create a model that provides support to consultants and participants in analysing their community and helps to estimate how the community will go on to develop. Consulting and practice makes different claims on a model than science does. Science is interested in describing phenomena as sophisticatedly as possible and creating concepts with a theoretically well-grounded basis. It is also not afraid to create complex models. When science uses sophisticated models for surveying and analysis, there is sufficient time available. For consulting it is more important to get the first impression quickly and with a reasonable amount of effort; typical forms of expression are required. Typologies have a second advantage; in addition to fast classification, they also provide information on alternatives. Thirdly, they enable standard offerings to be developed and assembled for similar CoPs. Community consultants and facilitators need to estimate potentials and developments in their work. Types make it possible to group and compare experiences. Do similar types of communities also go through similar experiences?

In this paper we report the *construction of an activity model (3)* by looking at activity patterns in CoPs. *A decision matrix (4)* allows attributing CoPs to the

elements of the model. We finally *arrive at a typology (5)* of CoPs by main community and domain activities, secondary activities and direction of development. We then draw c*onclusions for service development (6).*

3. Constructing an activity model

We chose a simple method in order to arrive at community types. Firstly, we recorded activities by eight communities and grouped them. According to Leont'ev [Leont'ev 81] we distinguish activity from the goal oriented action and the automatically performed operations. Following Engeström [Engeström 87] we look at the system composed of subjects realizing the activity, the object and tools of the activities and the community sharing the same object. We found five groups of activities: project-type activities, short term domain activities, management and social activities, and coordinated metacognition or reflection. Almost all recorded activities can be assigned to these groups. Using this activity model we interviewed participants and facilitators from twelve more communities. Were there typical activity patterns? We found three groups of activity patterns. The next developmental steps for CoPs with one of these patterns were examined on this basis. At the moment our initial data prove our assumption that the groups with typical activity patterns also display typical developmental patterns.

Naturally we are planning to test our hypotheses and suspicions with advanced data and would also like to encourage other research groups to do so. For the moment we can take them on our journey so far and describe how we proceeded and what data and considerations we used to create the provisional models, the activity model and the typological developmental model.

Structured interviews were conducted with eight CoPs taking part in the Palette research project, with the CoPs being asked about their activities among other things. The summary was approved with the CoPs, meaning that we can assume that we recorded them correctly and more or less completely.

Two groups of activities were easy to identify. Firstly, activities which were called projects by the CoPs themselves and which include the creation or revision of documents or conducting of smaller evaluations or research projects. This first group of activities is distinguished by a high degree of coordinated sub-activities and by the fact that a goal is communicated.

A second group of activities such as a Christmas dinner, going for a drink together or congratulations on a new job can be classified in the "social activities" category. They are distinguished by the fact that they have nothing to do with the domain, the community's actual interest, have no other explicit goal than to promote community cohesion.

We have the problem of delimitation just with these two categories. Some activities within a project are definitely social activities and a joint project also

promotes community cohesion. However, delimitation is only a problem if one intends to assign every activity to only one category or if categories are required which selectively contain only certain activities. Our goal, though, is to record types of communities later, which can be, for example, "Communities with a high level of project activity and little social activity outside projects" or "Communities with a high level of social activity but without projects". Therefore, at the moment it is enough to discover that we can differentiate projects from purely social activities and are aware that social activities are also always included in project activities.

A third group of activities is more difficult to grasp. These are activities such as distributing information on interesting links or conferences via a mailing list, posing questions and reacting to the answers, making one's own experiences available and discussing them with others, or also making important documents available to other people. These are short-term activities which are communicated with no higher objective or where the objective is inherent to the activity itself (I would like an answer to my question). These activities are also not co-ordinated with other activities as is the case in a project. They therefore really need to be clearly distinguished from the project dimension. Now there is, however, an important exception to this. Some more minor activities, typically questions and answers concerning certain e-learning platforms, for example, can lead to a project, to make a compilation of FAQs on the topic for example. Some groups may even decide to process the information as a report with recommendations on e-learning platforms. A project can therefore arise from short term domain activities.

Short term domain activities can be distinguished from social activities by their intentional reference to a domain inherent to the very first activity. Again it is clear that the CoP's domain can also be talked about during social activities like a Christmas dinner and that every exchange of questions and answers is also a social one. We therefore distinguish short term domain activities from social ones by their primary intention, to exchange via the domain.

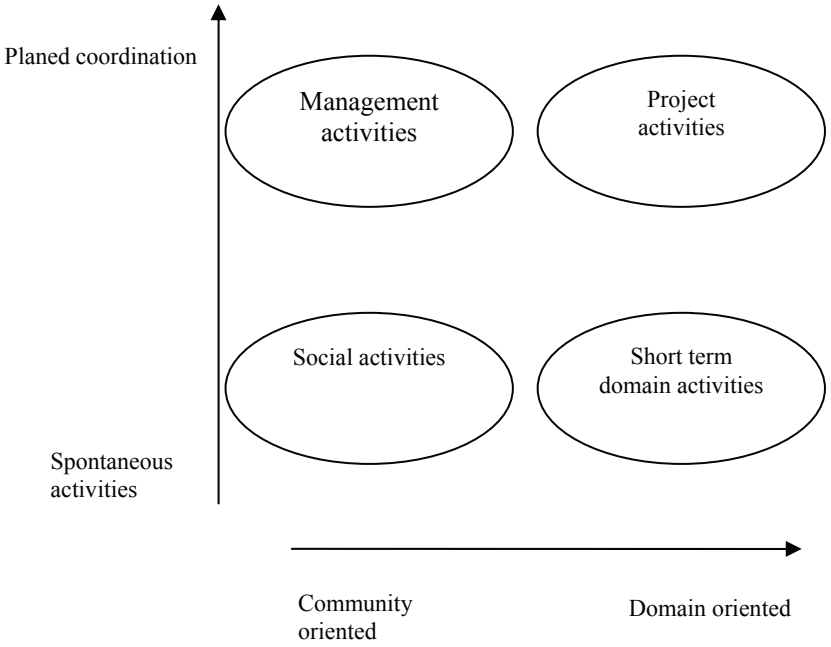

Figure 1. *Groups of activities and metacognition. The terms community and domain are used following Wenger [Wenger 98].*

As a fourth group we summarise four management activities which revolve around the filing of documents, organisation of meetings, facilitation, internal role distribution, work processes and setting up mailing lists. We call this the management category. It must be distinguished from the project. A series of activities is management if it refers primarily to the community. It is a project if it refers to the domain. The trickiest distinction is that from the social activity. Is the Christmas dinner now social, or management? If the objective is to strengthen community cohesion, then the activity is social. If the objective were to be to strengthen community organisation, because the Christmas dinner was the test run for an invitation system, the invitation procedure would be an management activity. Again, the objective delimitation is not the centrally important one for us, or the only one, but we are additionally able to take the subjective judgement. Members can decide whether they describe the activity as primarily social and improving cohesion, or primarily management and improving functioning.

We found a number of activities very difficult to classify: now if a working group is formed to investigate, reflect on and improve the organisation of the CoP – what is that? If the CoP gets together and exchanges experiences with its latest project– is that social, project-like or management? If we take intention as a

differentiation criterion, then the question is of improving similar future processes. If we describe the process, then that is a reflection. For such cases we agreed to introduce a new category, the metacognitive one, which can concern each of the four basic activities. Activities are assigned to this category if they are somewhat longer and more coherent, if they signify an exchange with several members, are therefore social and if they cover one of the basic categories, the domain-related projects or short term domain activities, or community focused social or management activities.

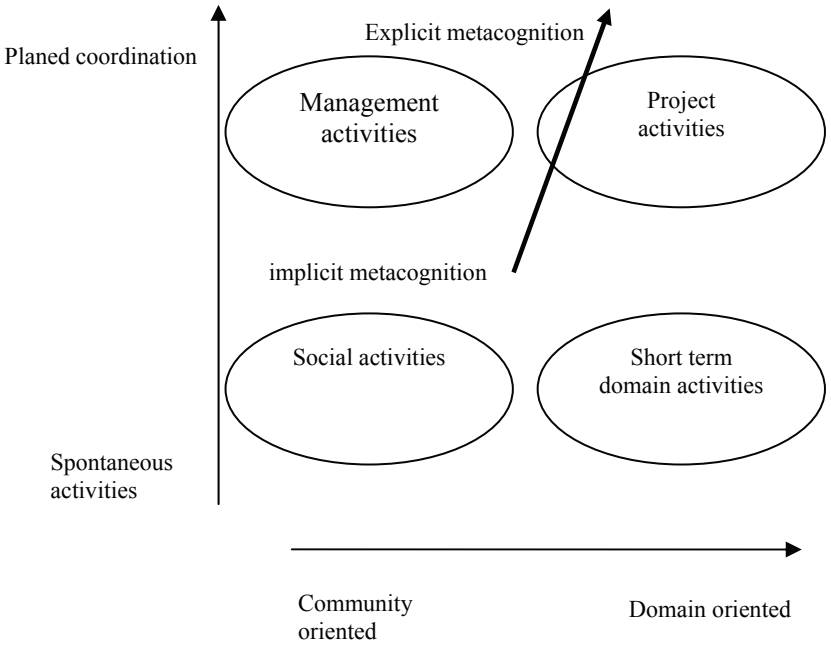

Figure 2. *Four groups of activities and metacognition on each of them*

4. Summary of the decision matrix for activities

This model could be used in a real context by labelling activities choosing among the two possibilities qualifying each of the following dimensions:

Domains at the focus: short term domain activities or projects

– Associated activities with communicated goals: *projects*

– Small combinations of activities with inherent goal: *short term domain activity*

Community at the focus: social or management activities

– Focus on explicitly named processes and structures: *management activities*

– Focus on cohesion and exchange: *social activities*

A Domain or Community activity at the focus: *metacognitive activity*

– *Explicit*: organised reflection with suggestions for improvement, aside from the basic activity.

– *Implicit*: Brief evaluations, retrospective reflections during the activity: understood as part of the basic activity.

The following description of the community think table – a community of knowledge managers – is an example how we use this matrix.

Think table has no *domain* related projects but a lot of short term activities that are mainly exchanges of one hour on a certain thematic during the two daylong meetings a year or short email exchanges over the mail list. These meetings are the main management activities, well planed with a lot of management activities. Social activities in between are rare. The community or domain activities are not explicitly reflected. Short and implicit evaluations of the last meeting steer the organisation of the next. The CoP could develop further activities. Because it has now some years of tradition a reflection of its activities could be interesting and the members could also be ready for a first project.

5. Arriving at a typology

Using this activities model we investigated the surveying and self-presentation of 12 communities which met for an exchange within the scope of the Swiss Agency of Development. These CoPs originate from extremely diverse domains such as engineering, developmental aid, gender interest, cultural diversity, education, environment, disaster.

We wanted to find out from these CoPs which activities are important for them and how satisfied they are with the activity. Important activities with which they are not satisfied simply signify a development potential which need not to be motivated.

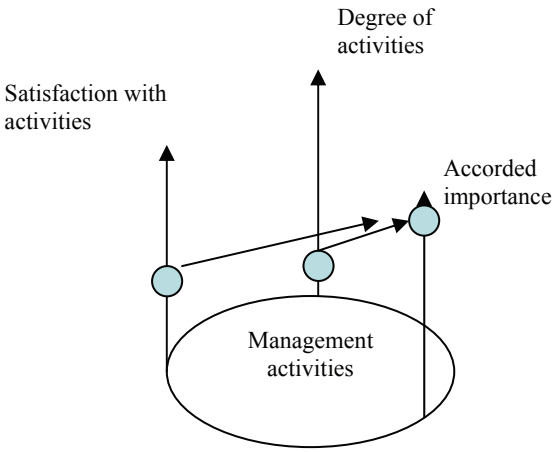

Figure 3: *The activity analysis vectors. We ask CoP members about levels of satisfaction with activities and the degree of activities (circles). A vector(arrow) is constructed by linking these levels with the accorded importance (cercle). Low satisfaction and a low degree of activity but a high accorded importance gives a rising vector that means a development potential.*

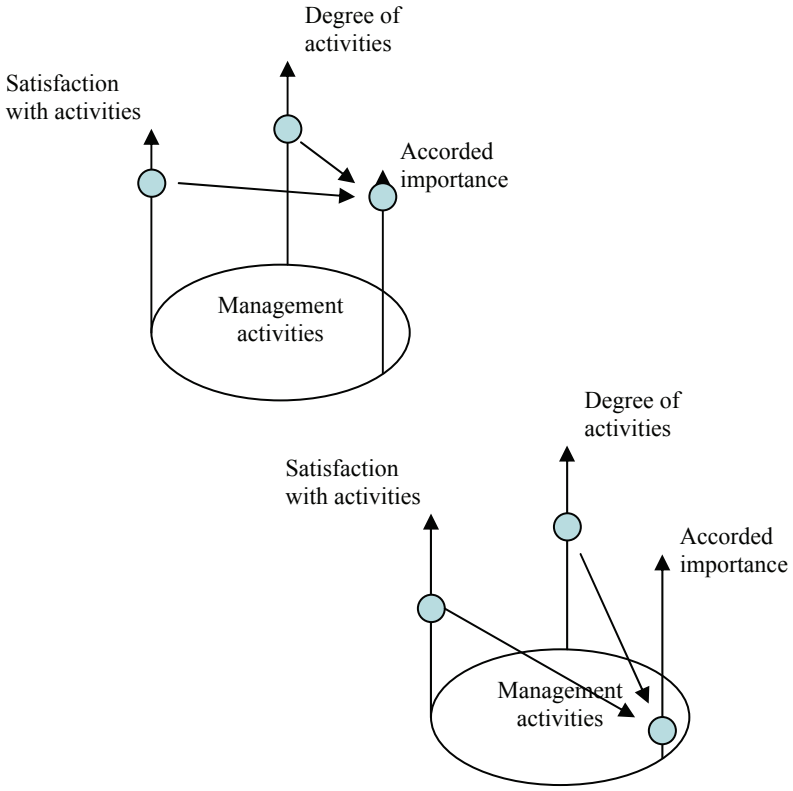

Figure 4. *Important activities with high degree of activity and high satisfaction have low development potential on this both level and satisfaction. The vectors towards the accorded importance are flat on a high level. Activities with low accorded importance need motivation before they can be developed. Vectors drop.*

Further, we wanted to know how they view their further development along this developmental potential. Twelve communities are not yet sufficient for a real model formation. Yet we are nonetheless able to decide whether, within the activities, each of these communities has a highly autonomous, individual profile or whether groups with similarities, therefore types, can be recognised. For an initial examination we had the opportunity to call in the structured, well-prepared self-presentation of thirteen other communities in order to be able to check the initial typology.

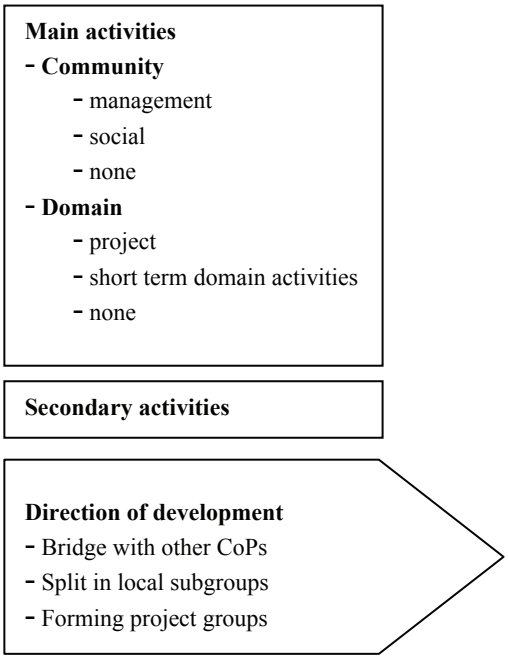

Figure 5. *Activity and development grid for communities: Main activities, secondary activities and direction of development are major dimensions for the description of CoP. The examples stem of the twelve investigated CoP.*

Therefore we used an activity and development grid to interview the CoPs. We asked for the main and the secondary activities (neglected or non existing activities) in both the community and the domain. Then we enriched the direction of development we detected with the activity analysis vectors with specific information about the CoP to understand the developmental directions in its context. We were especially in types CoP. We are able to distinguish the following three types at the moment.

1. We see communities which come together within an operation and implement joint projects. These communities have a low focus on purely social activities, because this already occurs during the remaining daily work. The project establishing the domain itself is so all-pervading and is so taken for granted that it is not described as an actual community activity. This CoP consciously focuses its main attention on organising the CoP and processes before, during and after its project activities and has its project and its organisation as the main object of metareflection.

Further development is seen in having a number of members of the CoP exchange with other similar communities, primarily making social contact, but then

also carrying out smaller exchanges of experiences, mainly on the fringes of conferences which deal with the domain of their own project.

Typical CoPs with this form of expression are those which deal with training procedures or disaster operations. The "Projects in an institution" CoP develops management and project-related activities as a whole, sub-groups spin off and take up social contact with other similar communities and also cultivate minor, joint activities with these communities.

2. A second community type consists of experts in a domain who wish to pass their topic onto others, this can be gender, culture, north-south divide and other subjects. Let's call them "Communities with a mission". They attempt to make available joint exchange and information on activities on their subject and cultivate extensive social exchange primarily in order to form opinions and judgements, therefore metareflection, on certain topics. Their development project is, then, more of the management kind: small local groups are meant to implement local projects. Further, they are interested in having as many people as possible deal at least peripherally with their topic. "Communities with a mission" primarily develop metareflective and management activities concerning their domain, alongside many social and minor activities and try to grow if possible. Further, as soon as enough people commit themselves locally, they have a tendency to spin-off local management units which find their cohesion in small local projects.

3. The third community type is that which practises an identical activity in its profession. For example, these are water engineers, development co-ordinators or coaches. Their main concern is to make know-how mutually available and to provide support, of a social nature too, in their daily work and in the event of problems. Social and minor activities are rarely accompanied by metareflection. From time to time a sub-group develops project-like activities or makes efforts to improve internal organisation.

6. Further meanings and conclusions for services development

Interviews with the CoPs members and moderators gave further meanings and tips for conclusions of the previous findings:

The conscious development of all groups occurs via sub-groups. These sub-groups implement projects, take up contact with other communities and network there or form local sub-groups with their own minor activities.

Communities with exclusively social and minor activities to do with the domain produce few documents and are satisfied with their current communication methods, which they are also familiar with from their workplace. They rarely report a difference between importance of an activity and satisfaction with it.

CoPs which place value on metareflection need the most intensive facilitator activity in order to keep reflection coherent, achieve profundity and to analyse. The

current communication instructions do not support cohesion and analysis of metareflection.

CoPs which implement projects do this in small groups. Their problem is making findings in the project and the documents accessible to others. Communities with current projects or with planned projects benefit from information and knowledge management tools.

In this perspective, PALETTE doesn't aim at offering a new integrated and exhaustive technological environment for CoPs. It aims [Gorga, 2007] at offering a set of services tailored to the specific needs of CoPs. In other words, PALETTE would allow the adaptation of the services performed by its users while using it, in order to satisfy the needs that were not properly accounted for in the original "version". Considering the specific case of CoPs activities system, tailoring could take the form of modules or features which can be added to or removed from the system by its administrator or final users. The promotion of such technical solutions as tailoring for example imply, beyond the interoperability of system, the necessity to depict the user perspective about tools functioning. That is the reason why interoperability issues and participatory design methodology constitute the ground of the PALETTE project.

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… une étude de cas vue sous l'angle de la théorie des communautés de pratique

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RÉSUMÉ. *La notion de communauté de pratique peut jouer un rôle important dans une nouvelle réflexion sur l'apprentissage. De nombreuses théories sur le sujet se multiplient dans la littérature. Néanmoins, comme le soulignent Dameron et Josserand (2005), il manque une analyse processuelle du développement des communautés de pratique. Il existe un décalage réel entre la richesse conceptuelle des travaux sur cette forme d'organisation et le peu d'études en profondeur sur la dynamique de ce type de groupes, les « phases » de leur développement ainsi que sur l'impact effectif du partage des pratiques. Un certain nombre d'enquêtes (Dameron & Josserand, 2005 ; Cappe, 2005 ; Laferrière, 2005) ont déjà été réalisées. Notre travail entre dans cette démarche de validation du concept de communauté de pratique. Nous présentons ici une étude de cas : le projet Form@HETICE. Cet article décrit notre travail d'observation de la situation actuelle et d'identification de l'existence ou non de communautés de pratique au sein de ce projet.*

MOTS-CLÉS : *communauté de pratique, Form@HETICE, apprentissage social, formation continuée, partage de connaissances, réseau d'échanges, apprentissage, Technologies de l'Information et de la Communication, TIC.*

1. Introduction

Actuellement, une perspective sociale de l'apprentissage influence de plus en plus l'organisation de la formation continue. C'est dans ce contexte que s'inscrit le développement de communautés de pratique (Lave & Wenger, 1991 ; Wenger, 1998 ; Wenger, 2005). Toutefois, cette notion reste encore floue et devrait être davantage être validée (Dameron & Josserand, 2005). Cet article vise à contribuer à clarifier ce concept et à l'illustrer à partir d'une étude de cas.

2. Une étude de cas: le réseau Form@HETICE

2.1. Objectifs

Form@HETICE est un réseau de partage de connaissances dans le domaine des Technologies de l'Information et de la Communication en Éducation (TICE). Il s'inscrit dans le contexte de la formation continuée d'enseignants des Hautes Écoles en proposant à des acteurs de terrain une série de formations et d'accompagnements à l'usage critique des TICE (cf. http://www.stecrifa.ulg.ac.be/formahetice).

Basé sur une étude de besoins (Deschryver & Charlier, 2000), ce projet a pour objet d'encourager et de promouvoir au sein de l'enseignement supérieur (Hautes Écoles de la Communauté française de Belgique) l'utilisation pédagogique et critique des TICE dans les pratiques des enseignants. Cinq axes contribuent à atteindre cet objectif :

- organisation de formations à l'usage d'outils et de supports technologiques destinées aux enseignants et étudiants des Hautes Écoles ;
- réalisation et mise à jour régulière de ressources de formation et d'auto-formation ;
- capitalisation des pratiques existantes et dissémination de ces expériences au sein du réseau Form@HETICE;
- accompagnement des enseignants dans la mise en place de projets innovants recourant aux TICE ;
- dynamisation, élargissement et pérennisation du réseau d'échanges Form@HETICE.

2.2. Activités du réseau

Les membres du réseau Form@HETICE sont des enseignants des Hautes Écoles (HE) dont certains ont un statut particulier, celui de « personne ressource » (PR). La mission des PR est l'implémentation technique et pédagogique des TIC dans l'enseignement et le soutien aux collègues intéressés par cette problématique.

Ils se réunissent en moyenne une fois par mois lors de **journées plénières**. La matinée est en général consacrée à des présentations et des discussions sur des sujets

choisis. L'après-midi est consacrée au travail en groupes thématiques. Entre les plénières, des outils sont mis en place pour faciliter les échanges à distance (site, liste de diffusion, Wiki et forums). Mais ces derniers sont en général spontanément très peu utilisés, les échanges et le travail s'effectuent avant tout en présentiel.

Les membres des **groupes thématiques,** avec l'aide d'un animateur, se fixent des objectifs et se divisent les tâches pour les atteindre. Ils sont responsables de leurs objectifs et de leur fonctionnement en groupe. En 2005-06, le réseau comportait quatre sous-groupes :

- **Le groupe « Formation à Accès Permanent » (FAP)** réunit une dizaine de personnes. Dès la première réunion, le groupe s'est basé sur les intérêts et les aspirations des enseignants à propos de la mise en place de formations accessibles à distance au sein des HE. Ses membres estiment que l'ambiance de travail est bonne et disent avoir envie de participer, d'apporter des idées et de partager, et tout simplement de se voir, car géographiquement, ils sont très éloignés les uns des autres et ils sont intéressés par ce qui se passe dans les différentes HE. En plus des journées plénières, le groupe a communiqué par e-mail pour échanger des informations ou poser des questions à d'autres membres. Les documents produits par le groupe, principalement via un Wiki, traitent entre autres de l'intégration de «l'enseignement virtuel» en formation initiale, de la présentation d'une collaboration virtuelle et d'une série de liens vers des sites intéressants dans le domaine.
- **Le groupe « Stages-TFE »** travaille sur le suivi des stages et des Travaux de Fin d'Études grâce aux TIC. Il s'est fortement réduit en cours d'année car les participants étaient très peu constants. Huit ou neuf la première fois, deux à trois en moyenne durant l'année. Lors de la première séance, le groupe a décidé de clarifier les deux concepts que sont « le suivi de stage » et le « travail de fin d'études ». Un premier problème est de suite apparu : il existe de nombreuses différences entre les départements des HE en matière de suivi de stages et de TFE. Après réflexion, une seconde difficulté s'est manifestée : les participants se sont rendus compte que les notions de stage et de TFE ne sont pas aussi liées qu'on aurait pu le croire. Le groupe a donc séparé les deux thématiques pour se concentrer uniquement sur l'utilisation des TIC dans le suivi des étudiants en stage. Durant les séances, le groupe et l'animateur ont surtout travaillé sur l'identification et l'analyse d'outils et de logiciels permettant un meilleur suivi à distance et un meilleur encadrement des stages. Comme le groupe précédent, celui-ci s'est uniquement vu durant les journées plénières et a communiqué à distance grâce aux e-mails et au téléphone. Les documents du groupe sont centrés sur les réflexions à propos des questions et des difficultés récurrentes liées à la gestion des stages.
- **Le groupe « Scénarios pédagogiques »** développe et imagine des scénarios pédagogiques recourant aux TIC. Le noyau du groupe qui resta le même durant l'année comprend quatre membres. Une ou deux personnes supplémentaires sont venues occasionnellement participer aux réunions. Le groupe s'est vu régulièrement lors des journées plénières, mais a très peu communiqué en-

dehors de celles-ci. L'animatrice a pris le rôle de facilitatrice plus que celui d'expert, contrairement au groupe « maitrise de la langue française » et « Stages-TFE » où l'animateur jouait ces deux rôles. L'objectif du groupe était de construire une banque de données englobant une série de scénarios pédagogiques incluant les TIC. Mais durant l'année, le groupe a rencontré un certain nombre de difficultés qui ont freiné les échanges, dont le départ prématuré des membres avant la fin des réunions et le manque de conviction de certains quant à la pertinence de rédiger explicitement des scénarios pédagogiques. Finalement, chaque membre a travaillé de manière individuelle sur son scénario. Ceci a eu pour conséquence de limiter les échanges et les discussions au sein du groupe. L'animatrice a centralisé les différents travaux afin de les diffuser via le site du réseau. Les productions et les documents du groupe comprennent des exemples et des grilles d'évaluation des scénarios pédagogiques ainsi que des canevas d'élaboration d'un scénario.

- **Le groupe « maîtrise de la langue française »**. Ce groupe aborde l'apport des TIC dans la maîtrise de la langue française et comprend sept à huit personnes. Au départ, les personnes se sont rassemblées autour de la problématique des difficultés que rencontrent les étudiants confrontés aux exigences de maîtrise de la langue française. Le groupe est resté stable et soudé tout au long de l'année. Il a travaillé sur différents outils et logiciels permettant l'amélioration de l'orthographe, de la syntaxe et de la grammaire des élèves. Les membres du groupe ont exprimé des demandes précises à l'animateur concernant des difficultés rencontrées par leurs étudiants. Celui-ci a surtout joué le rôle d'expert en amenant des ressources lors des réunions. Cela n'a pas empêché les membres du groupe d'apprendre et de partager leurs points de vue, mais il n'y pas eu de réelles productions communes. L'animateur a réalisé un certain nombre de démonstrations interactives de logiciels, avec pour but d'entamer des réflexions sur leur utilisation pédagogique. Les membres du groupe disent avant tout venir chercher de l'information. Le groupe s'est surtout rencontré durant les journées plénières, mais la communication passait aussi par les emails et le téléphone. Une personne dans le groupe a pris le rôle de secrétaire, ce qui permettait aux participants de recevoir après chaque réunion, un compte-rendu de ce qui avait été abordé et de garder une trace des discussions. Les objectifs du groupe ont évolué durant l'année en fonction des demandes des participants. Dans les productions du groupe, nous pouvons retrouver des documents sur la mise en page d'un document en traitement de texte (ici Word) et une liste (non exhaustive) de « bons logiciels » à utiliser en français.

2.3. Analyse sous l'angle de la théorie des communautés de pratique

Les membres du réseau Form@HETICE, dont ceux des groupes thématiques, poursuivent certains objectifs communs et s'organisent d'une certaine manière pour les atteindre. Mais peut-on qualifier ces groupes de « communauté de pratique » (CP) ?

a) Cadre conceptuel

Quels critères prendre en compte pour mener cette analyse ? Après une revue de la littérature (Cappe, 2005 ; Dupouët *et al*., 2002 ; Laferrière 2005 ; Laferrière *et al*., 2005 ; Vaast, 2002 ; Wenger, 2005), il apparaît que ce concept ne fait toujours pas l'objet d'une définition unanime. Notre approche se base sur une identification de ce type d'organisation à partir de différents critères (ou caractéristiques). Elle vise également à étudier leurs apports potentiels et leur impact sur le fonctionnement d'une telle communauté.

Selon nous, lors d'une analyse de cas, pour identifier ce type de groupe, les critères suivants doivent être pris en compte :

1. **Le contexte.** Il s'agit d'observer et de prendre connaissance du contexte où se développe la CP (historique, temps d'existence, rôles des membres, cultivée ou spontanée). Il s'agit de voir si le contexte est propice à l'apprentissage et au développement de groupes d'échanges.
2. **Les apprentissages personnels des membres.** Les membres d'une CP sont là avant tout pour réaliser des apprentissages dans leur domaine professionnel. Il est donc important d'identifier les apports de ce type de groupe dans les pratiques individuelles des membres. Nous devons identifier à quel(s) niveau(x) les apprentissages ont eu lieu et avec quels effets.
3. **Les trois critères de Wenger.** Les CP permettent de cadrer et structurer le travail collaboratif afin de systématiser les apprentissages et pérenniser un réseau d'échanges. Wenger (1998) propose trois critères nécessaires (mais pas suffisants) pour identifier une CP : l'engagement mutuel, l'entreprise commune et le répertoire partagé.
4. **La dynamique du groupe spécifique.** Une CP demande une dynamique de groupe spécifique, l'animateur doit avoir un leadership démocratique. Les membres quant à eux doivent s'impliquer dans le travail de groupe et favoriser au maximum les interactions. Le respect mutuel entre les membres est primordial et doit être omniprésent. Toute décison importante doit être le fruit d'une négociation permanente. Les membres doivent être dans un état d'esprit de coopération et pas de compétition. Chacun vient avec ses compétences et son niveau d'expertise dans le domaine.
5. **La structure des groupes.** Idéalement, une CP demande plusieurs couches successives (le noyau, les membres actifs et la périphérie) ainsi que la présence d'experts et de novices.

Entendons-nous sur l'utilité de cette approche. Il ne s'agit pas de rentrer dans une (inutile) démarche d'identification sur base de critères donnés dans le seul but qu'un groupe puisse affirmer porter l'étiquette « Communauté de Pratique ». Notre but est de mieux comprendre le fonctionnement d'une CP et de permettre de mieux distinguer ce type d'organisation par rapport à d'autres types de groupes existants comme une communauté d'apprenants ou une communauté d'intérêt (Henri et Pudelko, 2002).

b) Méthodologie

Pour identifier l'existence ou non de communauté(s) de pratique au sein du projet Form@HETICE selon ces critères, nous avons recouru à différentes méthodes : questionnaire adressé aux membres des groupes thématiques, interviews de la promotrice du projet et des animateurs des groupes, observations personnelles et discussions informelles au cours des réunions plénières.

Critères **Méthodes**	Contexte	Apprentissage	Critères de Wenger	Dynamique de groupes	Structure de groupes
Questionnaire		X	X	X	
Interviews	X		X	X	X
Observations	X				X

Le questionnaire a été créé à partir de la théorie sociale de l'apprentissage de Wenger et à partir de différents outils déjà utilisés dans le domaine. Nous nous sommes inspirés des grilles de lecture proposées par Cappe (2005, p. 8) et par Laferrière (2005, p. 6) ainsi que de la grille d'évaluation sur la participation à une communauté proposée par Langelier (2005).

c) Public-cible

Notre population est constituée des membres des quatre groupes thématiques présents au sein du projet Form@HETICE au cours de l'année 2005-2006, chacun de ces derniers pouvant être considéré comme une CP potentielle.

2.4. Résultats

L'analyse des données indique, sans équivoque que les groupes thématiques ne répondent pas à l'ensemble de nos critères (Milstein, 2006). Mais notre travail ne s'arrête pas là : nous pouvons identifier les points forts et points faibles de ces groupes et leur proposer des pistes d'action et de réflexion.

Nous constatons que les personnes ressources (PR) disent développer leurs compétences au niveau des TICE au sein des groupes thématiques. Seuls les membres du groupe « scénarios pédagogiques » n'ont pas fait transparaître ces acquis dans leurs réponses. Cependant, dans les trois autres groupes, les PR étaient en grande majorité d'accord pour dire qu'ils ont appris, qu'ils ont amélioré leurs pratiques et surtout que cet apprentissage s'est réalisé grâce aux interactions avec des professionnels du même domaine.

Parmi les quatre groupes thématiques étudiés, un seul aujourd'hui se rapproche de ce que l'on pourrait appeler une CP : le groupe « Maîtrise de la langue française ». Il n'en présente pas encore toutes les caractéristiques que nous avons définies, mais il montre une tendance vers l'émergence d'une CP. À ce groupe correspondent deux des trois critères proposés par Wenger : les membres de ce groupe ont développé de l'engagement les uns vis-à-vis des autres, ils ont une entreprise commune, échangent sur leurs pratiques et partagent leurs connaissances.

Mais à l'instar des autres groupes, il présente des faiblesses au niveau du répertoire partagé. Pour le dire autrement, si on se réfère à la dualité participation/réification (Wenger & Snyder, 2000) qui sous-tend la dynamique de groupe d'une CP, il donne une part trop importante à la participation au détriment de la réification. Une procédure plus rigoureuse pourrait être mise en place pour assister les membres du groupe à imaginer, produire, créer ensemble des outils, des documents qui deviendraient le « patrimoine » de la communauté. De plus, l'analyse de l'animation et de la dynamique de ce groupe révèle que celui-ci ne correspond pas non plus à la dynamique spécifique d'une CP. Les membres du groupe s'appuient trop sur l'animateur pour faire vivre la communauté.

Dans les trois autres cas, les objectifs du projet que sont le partage et la mise en réseau sont atteints, mais les groupes ne peuvent pas être définis comme étant des CP. D'une part, aucun des trois critères de Wenger n'est significativement présent dans ces groupes. D'autre part, nous pouvons dire que ce qui lie les personnes entre elles, ce n'est pas uniquement la passion ou l'intérêt pour un domaine. C'est avant tout la structure du projet qui fait que ces personnes se retrouvent une fois par mois pour partager et échanger.

Malgré tout, si l'on se réfère aux différents types de groupes qui existent, c'est avant tout d'une CP que les groupes thématiques se rapprocheraient le plus, parce que leur finalité correspond à celle d'une CP, c'est-à-dire à améliorer les pratiques professionnelles des PR.

3. Conclusion

Cette étude se veut une modeste contribution à la problématique des communautés de pratique. Son apport consiste principalement en une réflexion sur les caractéristiques à considérer pour identifier et soutenir le développement de telles communautés. Pour atteindre ces buts, une instrumentation de la démarche d'analyse ainsi que du soutien aux activités devrait être approfondie. D'une part, le questionnaire mis au point et utilisé ici va dans ce sens. D'autre part, l'usage d'outils technologiques pourrait aider et stimuler les membres de ces groupes à réifier leurs connaissances et à développer un répertoire partagé.

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Instrumentation d'une communauté de pratique virtuelle : illustration avec le portail TE-Cap

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RÉSUMÉ. *Dans cet article, nous étudions les besoins en instrumentation des Communautés de Pratique (CoPs) virtuelles. Nous montrons en quoi les environnements support aux communautés virtuelles en général ne répondent pas à tous ces besoins et proposons une démarche de conception itérative et participative d'un environnement destiné aux CoPs virtuelles. Nous mettons particulièrement en avant la gestion structurée des informations produites par la communauté et des interactions entre les membres, en montrant la nécessité de les classer à partir de thèmes liés à la pratique des acteurs. La démarche proposée est illustrée par la conception du portail TE-Cap, destiné à une communauté de tuteurs à distance. Nous présentons tout particulièrement l'outil de classification développé sur ce portail, que nous voulons rendre générique à tout type de CoP virtuelle.*

MOTS-CLÉS : *Communauté de pratique ; Environnement informatique ; Démarche de conception.*

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1. Introduction

Cet article tente d'apporter une réponse à la question « *Comment des outils en ligne et des services peuvent-ils soutenir les communautés de pratique ?* ». Pour cela, nous nous intéressons aux Communautés de Pratique (CoPs) virtuelles, que nous définissons comme des CoPs médiatisées par ordinateur. Nous présentons tout d'abord les principales caractéristiques de ce type de communauté, pour ensuite détailler les points fondateurs pour une démarche de conception d'environnements supports. Nous illustrons cette démarche par la présentation du portail communautaire TE-Cap que nous avons développé afin de supporter une CoP de tuteurs à distance.

2. Caractéristiques des CoPs

D'après [WENGER et al. 02], les CoPs sont des groupes de personnes au sein desquels les interactions entre membres permettent d'enrichir leur expérience, d'approfondir leurs connaissances et d'affiner leur expertise : "*groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis*." [SNYDER et al. 04] insistent sur la construction des compétences, à travers la collaboration entre membres : "*A community of practice is a particular type of network that features peer-to-peer collaborative activities to build member skills*". Cette définition reprend les idées de [VYGOTSKY 97] selon lesquelles l'interaction sociale joue un rôle fondamental dans le développement de la cognition. Les CoPs fonctionnent ainsi comme des "systèmes d'apprentissage social" où les membres se connectent pour résoudre des problèmes, partager des idées, établir des standards, construire des outils et développer des relations entre pairs. [SCARBROUGH & SWAN 99] mettent également en avant l'aspect social des CoPs : "*Socially, CoP are the fabrics of knowing as members of CoP acquire communal identity around a shared passion, relationships, roles and ways of intermingling common knowledge, practices and approaches*". Les membres, en interagissant sur le même sujet, définissent des connaissances, des pratiques et des approches communes, et créent une identité communautaire à laquelle ils se sentent appartenir.

Dans le contexte de cette étude, nous synthétisons les principales caractéristiques d'une CoP. Une CoP :

– favorise la construction de compétences, de connaissances et d'expertise ;
– incite les membres à partager un intérêt, des idées ou un ensemble de problèmes ;
– contribue à développer un sentiment d'appartenance à une véritable communauté en construction : établissement de standards, conception d'outils communs, partage d'approches et de pratiques.

Ces caractéristiques entraînent des besoins d'instrumentation pour les CoPs. Nous nous intéressons dans la partie suivante à l'instrumentation des communautés

virtuelles en général, pour étudier si les environnements informatiques proposés répondent bien aux besoins spécifiques des CoPs virtuelles.

3. Instrumentation des communautés virtuelles

[PREECE 01] définit une communauté virtuelle (« online community ») comme : "*any virtual social space where people come together to get and give information or support, to learn, or to find company*". Cette définition met en avant la notion d'espace virtuel dans lequel les personnes prennent et apportent des informations. Cette notion est également reprise par [FERNBACK & THOMPSON 95] qui insistent sur le besoin pour une communauté virtuelle de disposer d'un espace dédié : "*a specified boundary or place (e.g. a conference or chat line) that is symbolically delineated by topic of interest.*" Ainsi, aux caractéristiques précédentes, propres aux CoPs, nous devons ajouter la définition d'un espace spécifique dans lequel les membres des CoPs virtuelles vont interagir.

Dans le cadre du développement d'une technologie support à une communauté virtuelle, [PREECE 01] affirme que celle-ci doit être conçue en fonction de deux critères :

– un critère de **sociabilité** (« sociability »). Trois composantes contribuent à une bonne sociabilité : un but commun qui donne une raison de participer ; des personnes ayant chacune un intérêt, une attente ou un besoin ; des directives (un langage et des protocoles communs qui gèrent les échanges et guident les interactions).

– un critère d'**utilisabilité** (« usability ») du logiciel en tant que medium et un espace d'accueil d'interactions sociales. Quatre composantes sont essentielles : le support aux dialogues et aux interactions (facilité et rapidité) ; la présentation claire des informations (facilité de compréhension) ; la facilité et la rapidité pour trouver la bonne information ; la simplicité et la rapidité d'accès (exécution du logiciel).

[WILLIAM & COTHREL 00] associent trois types de management à la sociabilité : le développement des membres, le management des biens de la communauté, le management des relations au sein de la communauté. Plus spécifiquement, pour qu'une communauté virtuelle fonctionne intelligemment, cela nécessite une stratégie claire, des leaders, des règles et rôles, et des contenus utiles basés sur l'expertise. Les critères de sociabilité et d'utilisabilité sont également repris par [KOH & KIM 04] selon une approche socio-technique.

La prise en compte de ces deux critères conduit à mettre à disposition des membres, d'une part, des **outils de communication** tels que chat, blog ou forum et, d'autre part, des **répertoires** pour classer les documents proposés par les membres. Mais [CHARLIER et al. 06] ont souligné le manque d'outils et d'environnements communautaires virtuels soutenant la résolution de problèmes concrets liés à la pratique, le manque de support pour matérialiser la connaissance et la rendre accessible aux membres de la communauté et l'inadéquation des outils (e.g. forum,

listes de discussion) utilisés par ces communautés pour la construction de la connaissance et de l'identité des CoPs

Nous ajoutons donc un troisième critère aux critères de sociabilité et d'utilisabilité : celui d'**utilité**. Il s'agit là de la pertinence de l'environnement vis-à-vis des besoins et attentes de la communauté. Cela passe par une démarche de conception participative associant dès le départ les membres de la communauté qui expriment leurs attentes et besoins. Régulièrement, cette pertinence doit être contrôlée grâce à des outils de mesure d'efficacité dont est dotée la plate-forme.

4. Proposition d'une démarche d'instrumentation d'une CoP virtuelle

4.1. Besoins en instrumentation d'une CoP virtuelle

En nous appuyant sur les caractéristiques des CoPs précédentes, déterminons les besoins spécifiques en terme d'instrumentation d'une CoP virtuelle :

– aider chaque membre de la communauté à formaliser ses expériences et ainsi à développer ses connaissances et compétences ;
– favoriser le repérage des sources d'expertise et des compétences identifiées au sein de la communauté, en rapport avec la pratique des membres ;
– offrir un « chez soi » virtuel, spécifique à la communauté, dans lequel elle va construire sa propre identité, avec des thèmes et un vocabulaire liés à la pratique des membres ;
– favoriser le stockage de toutes les informations produites par la communauté, que ce soit un résultat d'interactions entre pairs (réflexions, idées, outils…), ou un apport individuel (témoignage, document, lien Web intéressant…) ;
– favoriser la recherche d'informations stockées qui peuvent être pertinentes pour un membre, en rapport à sa pratique.

Dans le cas d'une CoP virtuelle, les échanges entre membres sont des sources d'informations intéressantes à stocker de la même façon que tout autre document. Généralement, les interactions au sein des communautés virtuelles sont supportées par des mails, des chats ou des forums, outils pour lesquelles l'information est assez volatile. Seuls les forums sont classés par thèmes mais chaque message ne peut correspondre qu'à un seul thème (prédéfini dans la plate-forme) et la recherche s'effectue par mots-clefs. Nous pensons essentiel pour une CoP virtuelle d'offrir désormais une possibilité de structuration des informations produites et des interactions entre membres, selon plusieurs thèmes liés à la pratique des acteurs.

4.2. Démarche de conception de l'environnement

Dans une démarche d'instrumentation d'une CoP virtuelle, nous pensons essentiel d'adopter une approche itérative et participative. Cette démarche nécessite, d'une part, de développer l'environnement dans un souci de modularité et d'évolutivité et, d'autre part, d'impliquer les membres dans l'évolution de cet

environnement. Cette démarche donne la possibilité aux membres de construire une identité commune au sein de l'espace virtuel et de s'approprier les outils de façon à construire leurs propres pratiques autour de cet environnement. Nous proposons la démarche de conception suivante (cf. figure 1) :

Étape 1) Identification des spécificités de la CoP, à l'aide d'entretiens avec des membres ou à la lecture de documents concernant leurs pratiques :

– identification du **vocabulaire** et **thèmes** liés à la pratique : utilisé pour construire une classification pour stocker et rechercher les informations produites par la communauté. Il évolue lors de l'usage de l'environnement par les acteurs ;

– identification des **connaissances** et **compétences** liées à la pratique des acteurs. Elles sont inscrites dans le profil des membres, selon une échelle de valeur (novice, intermédiaire, expert) ;

– identification des **types d'informations** utiles à la CoP (échanges de différentes natures, documents, liens Web…), ceci afin de déduire les outils de gestion des informations à mettre à disposition sur l'environnement.

Étape 2) Développement des outils suivants :

– outils de **gestion des informations** de chacun des membres, qu'il peut décider de rendre publiques (ou non). Il a ainsi un espace de travail privé et apporte des informations à la CoP à partir de cette espace ;

– outils d'**aide à la formalisation** : pour aider chaque membre à témoigner de ses expériences et pratiques et ainsi l'amener à une réflexivité favorisant le développement de ses connaissances et compétences.

– outils de **support aux interactions** : moyens de communication nécessaires entre membres de la CoP, en distinguant ceux considérés comme source d'informations (et donc à stocker) et ceux qui assurent la mise en relation entre les membres de la CoP (par exemple la possibilité d'envoyer des mails privés) ;

– outil de **stockage des informations** : à partir des thèmes identifiés dans la première étape, avec une même interface quelle que soit l'information, ceci dans un souci de cohérence de l'environnement. Nous proposons de les présenter sous forme d'une classification construite a priori (amenée ensuite à évoluer par l'usage). L'intérêt d'établir une classification initiale est de proposer un référentiel à partir duquel les membres peuvent réagir, soit en proposant de nouveaux thèmes, soit en lançant une discussion sur la classification elle-même, ce qui est un moyen supplémentaire d'amener les membres à réfléchir à leurs pratiques ;

– outil de **recherche des informations** pouvant être utiles à un membre à partir d'une même interface et des thèmes identifiés dans la première étape ;

– outil d'**aide à l'évolution du dispositif** : la plate-forme doit être équipée d'un outil de récolte de traces d'utilisation des différents outils proposés, afin de permettre le retour d'usage (utilisé dans l'étape 4).

Étape 3) Utilisation par les acteurs : chaque membre propose ses mots-clés pour le classer et rechercher de l'information. Ces mots-clés sont soumis au modérateur de la communauté qui décide de les ajouter ou non. Les mots-clés utilisés par les membres sont comptabilisés, ce qui permet par exemple de supprimer

celles jugées inutiles. Cette évolution des thèmes est nécessaire pour tenir compte de l'évolution même des usages et pratiques.

Étape 4) Retour d'usage : il s'agit régulièrement de redéfinir avec les acteurs (par analyse des traces d'utilisation et par questionnaire) les outils utiles, inutiles ou manquants parmi ceux développés dans la deuxième étape.

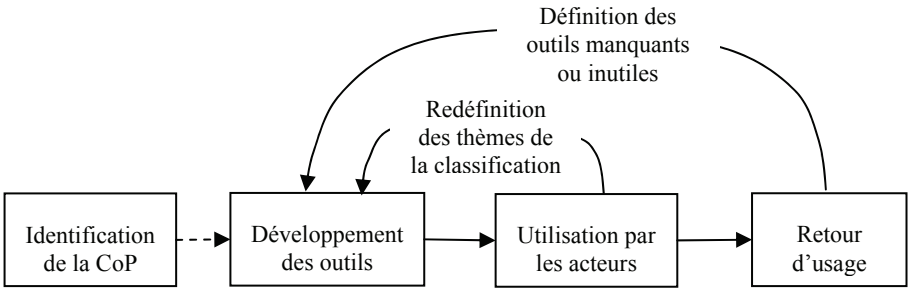

Figure 1. *Démarche de conception de l'environnement*

5. Conception d'un environnement informatique pour une CoP : le portail communautaire TE-Cap

5.1. Identification de la communauté à laquelle est destinée l'outil

Le portail communautaire TE-Cap a été développé pour répondre aux besoins d'une communauté de pratique de tuteurs à distance [GARROT et al. 07]. Dans le cadre d'une démarche itérative et participative, nous avons réalisé sept entretiens semi-dirigés auprès de tuteurs. A partir de ces entretiens et de la littérature traitant du tutorat, nous avons identifié cette communauté :

– les thèmes en relation avec une pratique de tutorat (représenté sous forme d'un modèle) ;

– les compétences et connaissances nécessaires aux tuteurs pour qu'ils puissent jouer leur rôle ;

– les informations utiles aux tuteurs dans leur pratique et qu'il est nécessaire de gérer par le portail. Elles sont réparties en trois catégories : messages des tuteurs (peuvent être de différentes natures : témoignages, discussions ou demandes d'aide) et commentaires associés, documents (proposés individuellement par les tuteurs ou résultat d'un travail collaboratif au sein de la communauté) et liens Web (les tuteurs peuvent soumettre des liens Web qu'ils trouvent intéressants).

La première étape de conception de la plate-forme TE-Cap a consisté à bien identifier la communauté à laquelle est destinée la plate-forme, ainsi que les pratiques de ses membres. Une CoP étant émergente par nature, un outil support n'a

pas pour rôle de construire la communauté mais plutôt d'offrir les ressources utiles et adaptées pour le développement de la communauté.

5.2. Choix de développement du portail TE-Cap

La conception de la plate-forme TE-Cap, repose sur le CMS (*Content Management System*) Joomla. Nous avons opté pour ce CMS en fonction de critères et parmi une liste conséquente de CMS existants[1]. Les raisons principales de ce choix sont, d'une part, qu'il propose des fonctionnalités de base que nous n'avons pas besoin de développer à nouveau (telles que la gestion des utilisateurs, des messages et des documents) et, d'autre part, que ses fonctionnalités reposent sur des composants indépendants, facilitant ainsi l'évolutivité et la modularité de TE-Cap. Dans cette logique, nous avons modifié certains composants et en avons ajoutés d'autres afin de répondre aux besoins identifiés précédemment. Ainsi, nous avons développé les composants de classification et de recherche des ressources proposées par les membres de la communauté (cf. partie 5.4), dont l'interface repose sur le modèle des thèmes en relation avec une pratique de tutorat que nous avons défini dans la première étape.

5.3. Profil des membres et support aux interactions

Nous avons montré précédemment l'importance pour une CoP de favoriser le repérage des sources de connaissance et compétences, identifiées au sein de la communauté. Ainsi un tuteur novice dans un domaine pourra repérer un tuteur expert à qui il pourra demander de l'aide. L'entraide entre les membres d'une CoP est un des fondements pour le développement des compétences de chacun. Pour cela, nous rendons disponible le profil de chacun des tuteurs construit sur les informations suivantes :

– identité (pays, profession, âge…) ;
– parcours professionnel et universitaire (expérience du tutorat, formation au tutorat,…) ;
– formations encadrées (noms des formations, disciplines enseignées, établissements ou entreprises de formation) ;
– compétences auto-déclarées par le tuteur (pédagogique, technique, expertise du contenu…).

Le portail offre deux possibilités d'interactions entre les membres de la communauté :

– l'envoi d'un mail à un membre de la communauté à partir de son profil. Ainsi, si un tuteur est intéressé par le profil d'un membre de la communauté, il peut choisir de lui adresser un mail pour une communication d'ordre privé. Cet outil assure une mise en relation entre les membres et donne la possibilité de développer des relations entre pairs en dehors de l'espace offert par la plate-forme ;

[1] http://cmsmatrix.org/

– l'écriture de messages avec la possibilité de répondre lors de la consultation de ces messages par d'autres membres. Avant validation du message, le rédacteur doit indiquer son « intention » à l'écriture du message : témoignage, demande d'aide ou discussion. Ce choix l'incite à réfléchir au contenu du message qu'il vient d'écrire, ce qui l'engage à une réflexivité sur la pratique dont il témoigne. C'est également une indication pour la réponse au message par les autres membres. Après validation du message, le rédacteur est orienté vers une interface de classement du message selon plusieurs thèmes, interface que nous présentons en détail dans la partie 5.4 (cf. figure 3). Cet outil fonctionne comme un forum au niveau du mode de communication mais est classé de façon plus structurée selon des thèmes associés aux pratiques de la communauté et ces thèmes évoluent selon la communauté.

Dans un premier temps de conception de la plate-forme, nous avons souhaité offrir uniquement des outils de communication indispensables aux interactions entre membres, en distinguant un outil de mise en relation entre pairs et un outil d'échanges classés par thèmes et selon l'intention du rédacteur.

5.4. Gestion des informations par le portail

Le portail TE-Cap offre plusieurs outils de création, partage et stockage des informations apportées ou produites par chacun. Lorsqu'un tuteur se connecte, il peut notamment choisir de gérer ses messages, gérer ses documents ou gérer ses liens web (cf. figure 2). Pour chacune de ces fonctionnalités, il visualise la liste des ressources qu'il a déjà soumises, le nombre de fois où elles ont été visualisées par les membres de la communauté et peut créer de nouvelles ressources. Cette conception de la plate-forme donne la possibilité au tuteur de gérer les informations qu'il apporte à la communauté, ainsi que l'intérêt suscité par celles-ci (nombre total d'accès).

Figure 2. *Gestion des messages par chaque membre de la communauté*

Le stockage des informations produites par la communauté est réalisé grâce à une interface de classification (cf. figure 3) utilisée à chaque nouvelle soumission par l'un des membres, que ce soit un message, un document ou un lien Web. Cette classification résulte là encore de notre démarche de conception itérative et participative, condition sine qua non d'acceptation et d'appropriation des outils par la communauté. Les échanges qui ont lieu entre les membres d'une CoP sont une source de connaissances à exploiter, c'est pourquoi il faut les classer comme tous les autres types de ressources, selon des thèmes liés aux pratiques des acteurs. Nous voulons rendre cet outil générique, afin d'être transposable à d'autres CoPs virtuelles, en donnant pour chacune la possibilité de définir ses propres thèmes.

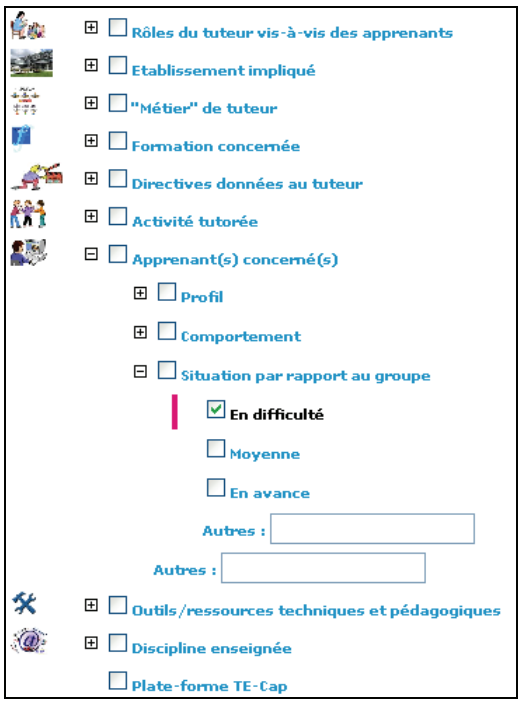

Figure 3. *L'interface de classification et de recherche des ressources de TE-Cap*

6. Conclusion

Nous avons dégagé les caractéristiques principales des CoPs virtuelles afin de déterminer les besoins concrets auxquels un outil support à la communauté peut répondre. Nous avons montré l'importance pour la conception de ce type d'outil de suivre une démarche itérative et participative, proposant une mise en relation des outils de communication avec un outil de gestion des connaissances produites par les échanges au sein de la communauté. Le portail communautaire TE-Cap, destiné à supporter une CoP de tuteurs à distance, illustre la démarche proposée. Le

développement d'un outil de classification permet de classer et rechercher toutes les informations produites par la communauté à partir d'une interface proposant des thèmes propres aux pratiques liées à la communauté.

Actuellement, TE-Cap est utilisé par des tuteurs de la communauté de pratique t@d, initiée et facilitée par Jacques Rodet[2]. Nous obtiendrons un premier retour d'usage du portail. Nous nous appuierons sur ces résultats dans le prochain cycle de conception. Nous souhaitons à terme généraliser cette démarche et rendre l'outil de classification générique pour le transposer à d'autres portails communautaires, en donnant la possibilité pour chaque CoP de déterminer ses propres thèmes.

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Incremental formalization of argumentative collaboration

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ABSTRACT. *Arguing that a varying level of formality needs to be offered in systems supporting argumentative collaboration, this paper proposes an incremental formalization approach that has been adopted in the development of CoPe_it!, a web-based tool that complies with collaborative principles and practices, and provides members of communities engaged in argumentative discussions and decision making processes with the appropriate means to collaborate towards the solution of diverse issues. According to the proposed approach, incremental formalization can be achieved through the consideration of alternative projections of a collaborative workspace.*

KEYWORDS: *Computer-Supported Collaborative Work, Communities of Practice, Knowledge Management, Argumentative Collaboration.*

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1. Introduction

Designing software systems that can adequately address users' needs to express, share, interpret and reason about knowledge during a session of argumentative collaboration has been a major research and development activity for more than twenty years (de Moor and Aakhus, 2006). Designing, building, and experimenting with specialized argumentation and decision rationale support systems has resulted to a series of argument visualization approaches. Technologies supporting argumentative collaboration usually provide the means for discussion structuring, sharing of documents, and user administration. They support argumentative collaboration at various levels and have been tested through diverse user groups and contexts. Furthermore, they aim at exploring argumentation as a means to establish a common ground between diverse stakeholders, to understand positions on issues, to surface assumptions and criteria, and to collectively construct consensus (Jonassen and Carr, 2000).

When engaged in the use of these technologies, through a software system supporting argumentative collaboration, users have to follow a specific formalism. More specifically, their interaction is regulated by procedures that prescribe and - at the same time - constrain their work. This may refer to both the system-supported actions a user may perform (types of discourse or collaboration acts), and the system-supported types of argumentative collaboration objects (e.g. one has to strictly characterize an object as an idea or a position). In many cases, users have also to fine-tune, align, amend or even fully change their usual way of collaborating in order to be able to exploit the system's features and functionalities. Acknowledging that the above are necessary towards making the system interpret and reason about human actions (and the associated resources), thus offering advanced computational services, there is much evidence that sophisticated approaches and techniques often resulted to failures (Shipman and McCall, 1994). This is often due to the extra time and effort that users need to spend in order to get acquainted with the system, the associated disruption of the users' usual workflow (Fischer et al., 1991), as well as to the "error prone and difficult to correct when done wrong" character and the prematurely imposing structure (Halasz, 1988) of formal approaches.

As a consequence, we argue that a varying level of formality should be considered. This variation may either be imposed by the nature of the task at hand (e.g. decision making, joint deliberation, persuasion, inquiry, negotiation, conflict resolution), the particular context of the collaboration (e.g. legal reasoning, medical decision making, public policy), or the group of people who collaborate each time (i.e. how comfortable people feel with the use of a certain technology or formalism). The above advocate an incremental formalization approach, which has been adopted in the development of CoPe_it!, a web-based tool that is able to support argumentative collaboration at various levels of formality. CoPe_it! complies with collaborative principles and practices, and provides members of communities

engaged in argumentative discussions and decision making processes with the appropriate means to collaborate towards the solution of diverse issues. According to the proposed approach, incremental formalization can be achieved through the consideration of alternative projections (i.e. particular representations) of a collaborative workspace, as well as through mechanisms supporting the switching from one projection to another.

This paper focuses on the presentation of the above approach. More specifically, Section 2 comments on a series of background issues related to reasoning and visualization, as well as on related work. Section 3 presents our overall approach, illustrates two representative examples of different formality level and sketches the procedure of switching among alternative projections of a particular workspace. Finally, Section 4 discusses advantages and limitations of the proposed approach and outlines future work directions.

2. Background issues

The representation and facilitation of argumentative discourses being held in diverse collaborative settings has been a subject of research interest for quite a long time. Many software systems have been developed so far, based on alternative models of argumentation structuring, aiming to capture the key issues and ideas during meetings and create a shared understanding by placing all messages, documents and reference material for a project on a "whiteboard". More recent approaches pay particular attention to the visualization of argumentation in various collaborative settings. As widely argued, visualization of argumentation can facilitate problem solving in many ways, such as in explicating and sharing representations among the actors, in maintaining focus on the overall process, as well as in maintaining consistency and in increasing plausibility and accuracy (Kirschner et al., 2003).

Generally speaking, existing approaches provide a cognitive argumentation environment that stimulates reflection and discussion among participants (a comprehensive consideration of such approaches can be found in (Karacapilidis et al., 2005)). However, they receive criticism related to their adequacy to clearly display each collaboration instance to all parties involved (usability and ease-of-use issues), as well as to the structure used for the representation of collaboration. In most cases, they merely provide threaded discussion forums, where messages are linked passively. This usually leads to an unsorted collection of vaguely associated positions, which is extremely difficult to be exploited in future collaboration settings. As argued in (van Gelder, 2003), "packages in the current generation of argument visualization software are fairly basic, and still have numerous usability problems". Also important, they do not integrate any reasoning mechanisms to (semi)automate the underlying decision making processes required in a collaboration setting. Admittedly, there is a lack of consensus seeking abilities and decision-making methods.

Taking the above into account, we claim that an integrated consideration of visualization and reasoning is needed in an argumentative collaboration context. Such an integrated consideration should be in line with incremental formalization principles. More specifically, the above integration should efficiently and effectively address problems related to formality (Shipman and Marshall, 1994). As discussed in (Shipman and McCall, 1994), "users want systems be more of an active aid to their work - to do more for them; yet they already resist the low level of formalization required for passive hypertext". Existing work on incremental formalization argues that problems related to formality have to be solved by approaches that (i) do not necessarily require formalization to be done at the time of input of information, and (ii) support (not automate) formalization by the appropriate software.

At the same time, the abovementioned integrated consideration should be also in line with the *information triage* process (Marshall and Shipman, 1997), i.e. the process of sorting and organizing through numerous relevant materials and organizing them to meet the task at hand. During such a process, users must scan, locate, browse, update and structure effortlessly knowledge resources that may be incomplete, while the resulting structures may be subject to rapid and numerous changes.

3. Our approach

The research method adopted for the development of the proposed solution follows the Design Science Paradigm, which has been extensively used in information systems research (Hevner et al., 2004). Having followed this paradigm, our main contribution lies in the development of a web-based tool for supporting argumentative collaboration and the underlying creation, leveraging and utilization of the relevant knowledge. Generally speaking, our approach allows for distributed (synchronous or asynchronous) collaboration and aims at aiding the involved parties by providing them with a series of argumentation, decision making and knowledge management features. Moreover, it exploits and builds on issues and concepts discussed in the previous section.

3.1. Analysis of requirements

A series of interviews with members of diverse communities (from the engineering, management and education domains) has been performed in order to identify the major issues they face during their argumentative collaboration practices. These issues actually constitute a set of challenges for our approach, in that the proposed collaboration model and infrastructure must provide the necessary means to appropriately address them. These issues are:

- *Management of information overload:* This is primarily due to the extensive and uncontrolled exchange of comments, documents and, in general, any

type of information/knowledge resource, that occurs in the settings under consideration. For instance, such a situation may appear during the exchange of ideas, positions and arguments; individuals usually have to spend much effort to keep track and conceptualize the current state of the collaboration. Moreover, such situations may ultimately harm a community's objectives.

- *Diversity of collaboration modes* as far the protocols followed and the tools used are concerned: Interviews indicated that the evolution of the collaboration proceeds incrementally; ideas, comments, or any other type of collaboration object are exchanged and elaborated, and new knowledge emerges slowly. When a community's members collaboratively organize information, enforced formality may require specifying their knowledge before it is fully formed. Such emergence cannot be attained when the collaborative environment enforces a formal model (i.e. predefined information units and relationships) from the beginning. On the other hand, formalization is required in order to ensure the environment's capability to support and aid the collaboration efforts. In particular, the abilities to support decision making, estimation of present state or summary reports benefit greatly from formal representations of the information units and relationships.
- *Expression of tacit knowledge:* A community of people is actually an environment where tacit knowledge (i.e. knowledge that the members do not know they posses or knowledge that members cannot express with the means provided) predominantly exists. Such knowledge must be able to be efficiently and effectively represented.
- *Integration and sharing of diverse information and knowledge:* Many resources required during a collaborative session have either been used in previous sessions or reside outside the members' working environment. Moreover, outcomes of past collaboration activities should be able to be reused as a resource in subsequent collaborative sessions.
- *Decision making support:* Many communities require support to reach a decision. This means that their environment (i.e. the tool used) needs to interpret the information types and relationships in order to proactively suggest trends or even calculate the outcome of a collaborative session (e.g. as is the case in voting systems).

3.2. Conceptual approach

To address the above issues, our approach builds on a conceptual framework where *formality* and the *level of knowledge structure* during argumentative collaboration is not considered as a predefined and rigid property of the tool, but rather as an adaptable aspect that can be modified to meet the needs of the tasks at hand. By the term formality, we refer to all the rules enforced by the system and to which all discourse actions of users must comply. Allowing formality to vary within the collaboration space, incremental formalization, i.e. a stepwise and controlled

evolution from a mere collection of individual ideas and resources to contextualized and interrelated knowledge artifacts, can be achieved.

In the proposed collaboration model, *projections* constitute the "vehicle" that permits incremental formalization of argumentative collaboration (see Figure 1). A projection can be defined as a particular representation of the collaboration space, in which a consistent set of abstractions able to solve a particular organizational problem during argumentative collaboration exists. With the term abstraction, we refer to the particular discourse types, relationships and actions that are available at a particular projection, and with which a particular problem can be represented, expressed and - ultimately - be solved.

Each projection of the collaboration space provides the necessary mechanisms to support a particular *level of formality*. More specifically, the more informal is a projection, the more easiness-of-use is implied; at the same time, the actions that users may perform are intuitive and not time consuming (e.g. drag-and-drop a document to a shared collaboration space). Informality is associated with generic types of actions and resources, as well as implicit relationships between them. However, the overall context is human (and not system) interpretable. On the other hand, the more formal is a projection, easiness-of-use is reduced (users may have to go through training or reading of long manuals in order to comprehend and get familiar with sophisticated system features); actions permitted are less and less intuitive and more time consuming. Formality is associated with fixed types of actions, as well as explicit relationships between them. The overall context in this case is both human and system interpretable.

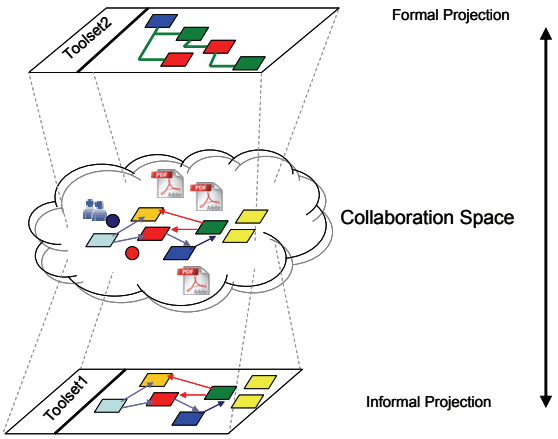

Figure 1. *Alternative projections of a collaboration space*

An informal projection also aims at supporting information triage. It is the informal nature of this projection that permits such an ordinary and unconditioned evolution of knowledge structures. While such a way of dealing with knowledge resources is conceptually close to practices that humans use in their everyday

environment (e.g. their desk), it is inconvenient in situations where support for advanced decision making processes must be provided. Such capabilities require knowledge resources and structuring facilities with fixed semantics, which should be understandable and interpretable not only by the users but also by the tool. Hence, decision making processes can be better supported in environments that exhibit a high level of formality. The formal projections of the collaboration space come to serve such needs.

3.3. Examples

To better illustrate our approach, this subsection presents two alternative (already implemented) projections of a particular collaborative session (the session is about which is the most appropriate treatment for a patient with breast cancer). The first one is fully informal and complies with the abovementioned information triage principles, while the second one builds on an IBIS-like formalism (Conklin and Begeman, 1989) and supports group decision making.

3.3.1. Informal projection

As mentioned above, the aim of an informal projection of the collaboration space is to provide users the means to structure and organize information units easily, and in a way that conveys semantics to users. Generally speaking, informal projections may support an unbound number of discourse element types (e.g. comment, idea, note, resource). Moreover, users may create any relationship among discourse elements (there are no fixed relationship types); hence, relationship types may express agreement, disagreement, support, request for refinement, contradiction etc. Informal projections may also provide abstraction mechanisms that allow the creation of new abstractions out of existing ones. Abstraction mechanisms include:

- *Annotation and metadata:* the ability to annotate instances of various discourse elements and add (or modify) metadata.
- *Aggregation:* The ability to group a set of instances of discourse elements so as to be handled as a single conceptual entity. This may lead to the creation of additional informal sub-projections, where a set of discourse elements can be considered separately, but still in relation to the context of a particular collaboration.
- *Generalization/Specialization:* The ability to create semantically coarse or more detailed discourse types. Generalization/specialization may not lead to additional informal projections but may help users to manage information pollution of the collaboration space leading to ISA hierarchies.
- *Patterns:* The ability to specify instances of interconnections between discourse elements (of the same or a different type) as templates acting as placeholders that can be reused within the discussion.

Figure 2 presents an example of an informal projection of the collaboration session considered. Medical doctors discuss the case of a particular patient aiming at

achieving a decision on the most appropriate treatment. Since initially the process of gathering and discussing the available treatment options is unstructured, highly dynamic and thus evolving rapidly, the informal space provides the most appropriate environment to support collaboration at this stage. The aim is to bring the session to a point where main trends crystallize, thus enabling the switch to a formal projection (upon the participants' wish).

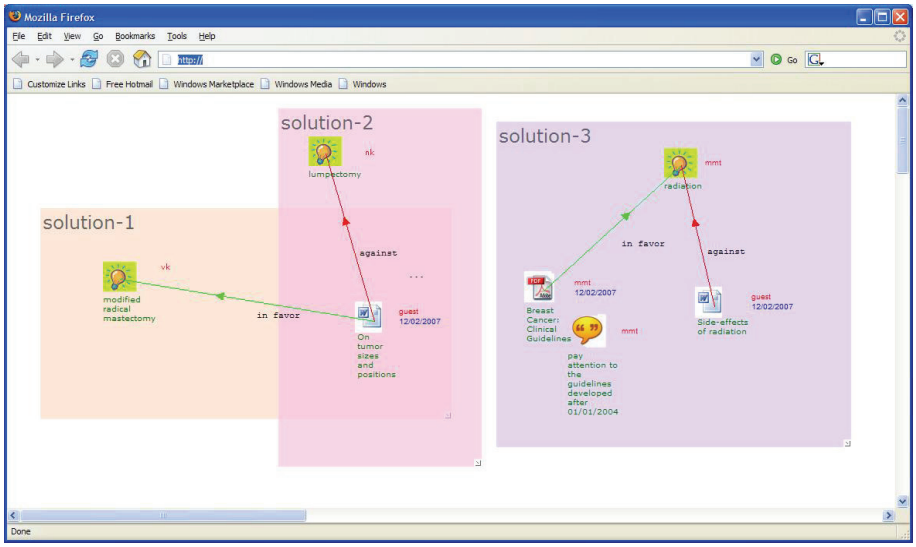

Figure 2. *Instance of an informal projection*

In the example of Figure 2, three approaches to the patience's treatment – proposed by three different users – have been (so far) elaborated, namely "modified radical mastectomy", "lumpectomy" and "radiation". Each proposed treatment is visible on the collaboration space as an "idea". Participants may use relationships to relate resources (documents, links etc.), comments and ideas to the proposed treatment. The semantics of these relationships are user-defined. Visual cues may be used to make the semantics of the relationship more explicit, if desired. For instance, a red arrow indicates comments and resources that express objection to a treatment, while green arrows express approval of a treatment. Note that the resource entitled "On tumor sizes positions" seems to argue against the solution of "lumpectomy" while, at the same time, it argues in favor of "modified radical mastectomy". This is due to the information contained in it (in that some "chunks" advocate or avert from a particular solution; this is to be further exploited in a formal projection). Other visual cues supported in this projection may bear additional semantics (e.g. the thickness of an edge may express how strong a resource/idea may object or approve a treatment). Informal projections also provide mechanisms that help aggregating aspects of collaboration activities. For example the colored rectangles labeled as "solution-1", "solution-2" and "solution-3" help participants visualize what the current alternatives are. Although - at this projection

instance – these rectangles are simply visual conveniences, they play an important role during the switch to formal projections, enabling the implementation of abstraction mechanisms.

3.3.2. Formal projection

While an informal projection of the collaboration space aids the exploitation of information by users, a formal projection aims mainly at the exploitation of information by the machine. As noted above, formal projections provide a fixed set of discourse element and relationship types, with predetermined, system-interpretable semantics. More specifically, the formal projection presented in Figure 3 is based on the approach followed in the development of *Hermes* (Karacapilidis and Papadias, 2001). Beyond providing a workspace that triggers group reflection and captures organizational memory, this projection provides a structured language for argumentative discourse and a mechanism for the evaluation of alternatives. Taking into account the input provided by users, this projection constructs an illustrative discourse-based knowledge graph that is composed of the ideas expressed so far, as well as their supporting documents. Moreover, through the integrated decision support mechanisms, participants are continuously informed about the status of each discourse item asserted so far and reflect further on them according to their beliefs and interests on the outcome of the discussion. In addition, the particular projection aids group sense-making and mutual understanding through the collaborative identification and evaluation of diverse opinions.

The discourse elements allowed in this projection are “issues”, “alternatives”, “positions”, and “preferences”. Issues correspond to problems to be solved, decisions to be made, or goals to be achieved. They are brought up by users and are open to dispute (the root entity of a discourse-based knowledge graph has to be an issue). For each issue, users may propose alternatives (i.e. solutions to the problem under consideration) that correspond to potential choices. Nested issues, in cases where some alternatives need to be grouped together, are also allowed. Positions are asserted in order to support the selection of a specific course of action (alternative), or avert the users’ interest from it by expressing some objection. A position may also refer to another (previously asserted) position, thus arguing in favor or against it. Finally, preferences provide individuals with a qualitative way to weigh reasons for and against the selection of a certain course of action. A preference is a “tuple” of the form [position, relation, position], where the relation can be “more important than” or “of equal importance to” or “less important than”. The use of preferences results in the assignment of various levels of importance to the alternatives in hand. Like the other discourse elements, they are subject to further argumentative discourse.

The above four types of elements enable users to contribute their knowledge on the particular problem or need (by entering issues, alternatives and positions) and also to express their relevant values, interests and expectations (by entering positions and preferences). Moreover, the system continuously processes the elements entered by the users (by triggering its reasoning mechanisms each time a

new element is entered in the graph), thus facilitating users to become aware of the elements for which there is (or there is not) sufficient (positive or negative) evidence, and accordingly conduct the discussion in order to reach consensus.

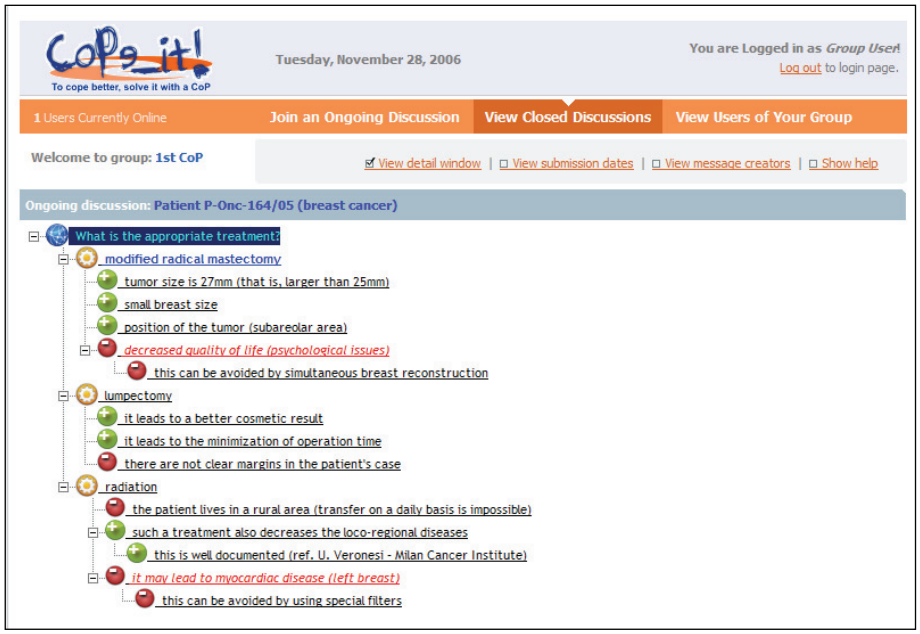

Figure 3. *Instance of a formal projection*

Further to the argumentation-based structuring of a collaborative session, this projection integrates a reasoning mechanism that determines the status of each discourse entry, the ultimate aim being to keep users aware of the discourse outcome. More specifically, alternatives, positions and preferences of a graph have an activation label (it can be "active" or "inactive") indicating their current status (inactive entries appear in red italics font). This label is calculated according to the argumentation underneath and the type of evidence specified for them ("burden of proof"). Activation in our system is a recursive procedure; a change of the activation label of an element is propagated upwards in the discussion graph. Depending on the status of positions and preferences, the mechanism goes through a scoring procedure for the alternatives of the issue (for a detailed description of the system's reasoning mechanisms, see (Karacapilidis and Papadias, 2001)). At each discussion instance, the system informs users about what is the most prominent (according to the underlying argumentation) alternative solution. In the instance shown in Figure 3, "modified radical mastectomy" is the better justified solution so far. However, this may change upon the type of the future argumentation. In other words, each time an alternative is affected during the discussion, the issue it belongs to is updated, since another alternative solution may be indicated by the system.

3.4. Switching projections

The projections discussed above could individually serve the needs of a particular community (for a specific context). However, they should be also considered (and exploited) jointly, in that a switch from one to the other can better facilitate the argumentative collaboration process. Adopting an incremental formalization approach, a formal projection can be considered as a filtered and machine-interpretable view of an informal one. Our approach is able to support cases where argumentative collaboration starts through the informal projection (see Section 3.3.1), where instances of any discourse element and relationship type can be created (by any participant). Such collaboration may start from an empty collaboration space or may continue elaborating an informal view of a past collaboration session (existing resources and relationships between them can thus be reused).

At some point of the collaboration, an increase of the formality level can be decided (e.g. by an individual user or the session's facilitator), thus switching to the formal projection (see Section 3.3.2), where discourse and relationship type instances will be transformed, filtered out, or kept "as-is". The above are determined by the associated (visualization and reasoning) model of the formal projection (consequently, this process can be partially automated and partially semi-automated). For instance, referring to the projections discussed above, the colored rectangles shown in Figure 2 will be transformed to the alternatives of Figure 3 (each alternative is expressed by the related idea existed in Figure 2). Moreover, provided that a particular resource appearing in the informal view has been appropriately annotated, the formal projection is able to exploit extracts ("chunks") of it and structure them accordingly. Such extracts appear as atomic objects at the formal projection. For instance, consider the multiple arguments in favor and against the alternatives of Figure 3; these have been resulted out of the appropriate annotation of the resources appearing in Figure 2.

One may also consider a particular argumentative collaboration case, where decrease of formality is desirable. For instance, while collaboration proceeds through a formal projection, some discourse elements need to be further justified, refined and elucidated. It is at this point that the collaboration session could switch to a more informal view in order to provide participants with the appropriate environment to better shape their minds (before possibly switching back to the formal projection). Note that there may exist more than one informal projections that are related to a particular formal view (depending on the type of the discourse element to be elaborated). Switching from a formal to an informal projection is also supported by our approach.

3.5. Other issues

In addition to the above, our approach permits users to create one or more private spaces, where they can organize and elaborate the resources of a collaboration space according to their understanding (and their pace). Although

private in nature, users are able to share such spaces with their peers. Moreover, each projection is associated with a set of tools that better suit to its purposes. These tools enable the population, manipulation and evolution of the discourse element types allowed in that particular projection. There can be tools allowing the reuse of information residing in legacy systems, tools permitting authoring of multimedia content, annotation tools, as well as communication and management tools.

A web-based prototype version of CoPe_it!, supporting various levels of formality using projections as the ones described above, has been implemented. The prototype makes use of Web 2.0 technologies, such as AJAX (Asynchronous JavaScript and XML), to deliver the functionalities of the different projections to end users. Based on these technologies, concurrent and synchronous collaboration in every projection is provided. Individual collaboration sessions are stored in XML format. There is at least one XML schema for each formality level (i.e. projection) that encodes and implements the constraints and rules that are active in it. More formal levels are manifested as more strict XML schemas, where types and relationships are fewer and more explicit than in cases of less formal levels.

4. Discussion and Conclusion

Referring to (Shipman and Marshall, 1994), we first draw remarks concerning the advantages and limitations of the proposed approach against issues such as cognitive overhead, tacit knowledge, premature structure, and situational differences. Speaking about the first issue, we argue that our approach mirrors working practices with which users are well acquainted (they are part of their ordinary tasks), thus exhibiting low "barriers to entry". Moreover, it reduces the overhead of entering information by allowing the reuse of existing documents (mechanisms for reusing existing knowledge sources, such as e-mail messages and entries or topics of web-based forums, have been also integrated). In addition, our approach is able to defer the formalization of information until later in the task. This may be achieved by the use of the appropriate annotation and ontology management tools. In any case, however, users may be averted from the use of such (usually sophisticated) tools, thus losing the benefits of a more formal representation of the asserted knowledge resources. A remedy to that could be that such processing is performed by experienced users. One should also argue here that, due to the collaborative approach supported, the total overhead associated with formalizing information can be divided among users.

Speaking about management of tacit knowledge, we argue that the alternative projections offered, as well as the mechanisms for switching among them, may enhance its acquisition, capturing and representation. Limitations are certainly there; nevertheless, claiming that our approach promotes active participation in knowledge sharing activities (which, in turn, enhances knowledge flow), we expect that all four phases (i.e., internalization, socialization, combination and externalization) of the Nonaka's and Takeuchi's (1995) famous knowledge transformation spiral can be

leveraged. Reuse of past collaboration spaces also contributes to bringing previously tacit knowledge to consciousness.

Our approach does not impose (or even advocate) premature structure; upon their wish, participants may select the projection they want to work with, as well as the tasks they want to perform when working at this projection (e.g. a document can be tagged or labeled whenever a participant wants; moreover, this process has not to be done in one attempt). Finally, considering situational differences, we argue that our approach is generic enough to address diverse collaboration paradigms. This is achieved through the proposed projection-oriented approach (each projection having its own structure and rationale), as well as the mechanisms for switching projections (such mechanisms incorporate the rationale of structures' evolution).

As mentioned above, the proposed approach is the result of action research studies for improving argumentative collaboration. It has been already introduced in diverse educational and organizational settings for a series of pilot applications. Preliminary results show that it fully covers the user requirements analyzed in Section 3.1. Also, it stimulates interaction, makes users more accountable for their contributions, while it aids them to conceive, document and analyze the overall argumentative collaboration context in a holistic manner. In addition, these results show that the learning effort for the proposed tool is not prohibitive, even for users that are not highly adept in the use of IT tools; in most cases, an introduction of less than an hour was sufficient to get users acquainted with the tool's features and functionalities.

Concluding, we argue that the proposed approach provides the means for addressing the issues related to the formality needed in argumentative collaboration support systems. It aims at contributing to the field of social software, by supporting argumentative interaction between people and groups, enabling social feedback, and facilitating the building and maintenance of social networks. Future work directions include the extensive evaluation of the corresponding system in diverse contexts and collaboration paradigms, which is expected to shape our mind towards the development of additional projections, as well as the experimentation with and integration of additional visualization cues, aiming at further facilitating and augmenting the information triage process.

Acknowledgments

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Exploring the selection of technology for enabling the CoPs development

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ABSTRACT. This paper aims to provide an exploration of tools and technologies that support common activity, to review the type of technologies and various features, and to explore how they can assist a community of practice through different phases of their evolution. Through surveying some of the technologies used for CoPs this paper serves as an introduction to the subject that discuss technology.

KEYWORDS: *community, community of practice, knowledge management, knowledge sharing, network analysis, tailoring, technology for community of practice.*

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1. Introduction

Communities of practice are self-governing groups of people who share a set a problems or a passion for the common domain of what they do and strive to become better at it [Wenger 1998, 1998a]. They create value for their members and the organization hosting them through: developing and spreading new knowledge and capabilities; fostering innovation; building and testing trust in working relationships [Por & van Bekkum 2004]. Examples of communities of practice are found in many organizations and have been called by different names at various times, names such as "learning communities" at Hewlett-Packard Company, "family groups" at Xerox Corporation, "thematic groups" at the World Bank, "peer groups" at British Petroleum, and "knowledge networks" at IBM Global Services [Gongla 2001], but they remain similar in general intent.

Community software helps the communities of practice by offering a set of tools for: knowledge development and sharing; relationship and trust building; community facilitation and management; system administration and customization, typically through a web interface [Wenger 2001, 2002].

In most CoPs today, the members communicate about their practices and collaborate via e-mail, forum and distribution list. Nevertheless, e-mails are difficult to keep organized and are not easing searchable. This disadvantage becomes frustrating especially when new members joint the CoP. It is known that the successful use of a system depends on the users, on their knowledge of the system, their attitudes towards it and the degree to which it matches their perception of the operations it is to support.

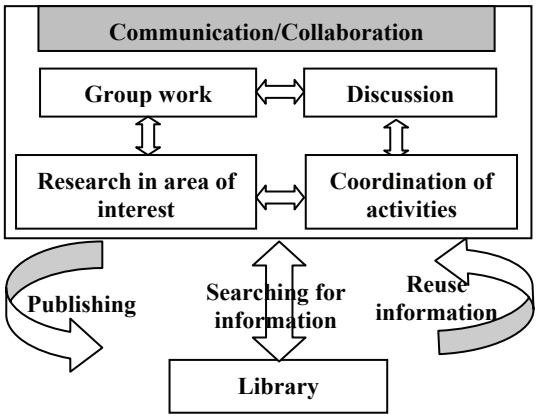
2. Tools' functionalities and CoP' requirements

One major concern in the development of adaptability, acceptability and accessibility of the tools and services is to develop a real communication between users and designers. A good design of technology is essential for the functioning of the CoPs. So, it is important that the technology designers have a good understanding of the goals, purpose, and the needs of the CoP before deciding how to design this technology to support the functioning of the CoP. The technology configuration will provide functionality to support learning, knowledge sharing and creation, as well as sociability and participation in the CoP [Preece 2000].

For analysing it, two main problems are crucial.

A). How do we select the appropriate solution corresponding to the requirements of a particular community concerning the setting up and/or the promotion of its activities?

To illustrate these requirements and depict the main flow of basic activities



(figure 1) within a Cop and their interactions and different levels of collaboration [Coleman 2002] we need to identify the necessary features of tools because a simple bulletin board or mailing list based on specific software, or a Web-based group with discussion threading and the ability to push e-mails maybe not enough.

Figure 1 Flow of activities

In contrast, with collaboration software, the history of the rich content that occurs in everyday problem solving and discussing is recorded and stored for others to see. All transactions and communications are in a searchable archive and this creates an "organizational memory".

More and more real time functionality and options to the creation and dissemination of work is required. Additionally, the speed of technological development has continued apace. This new technologies (Weblogs, Wiki, instant messaging, web services, etc.) and standards like XML [Decker et al., 2000] for describing data and semantic Web [Berners-Lee, Hendler & Lassila, 2001] can play a enhanced role in assisting CoPs. The semantic Web deploys two further enabling technologies: RDF [Brickley, 1999] provides the semantic mark-up and ontology [Fensel, 2001] languages supply a shared common understanding of a domain. This new technologies encourage CoPs in different social actions defined in the framework proposed by Ngwenyama and Lyytinen [Ngwenyama et al. 1997] or in different stages of CoPs' lifecycles [McDermott, 2000]. The Wenger' communities evolution model [Wenger 1998] maps each of the five stages into their main functions like connect, commit, create context, operate, collaborate, sustain and maintain.

If in the initiation stage a CoP needs enabling technologies like e-mail, e-conferencing, listservers, online forums or Web-integrated platform, in the maturing stage it have more requirements for information repository, analytical and decision making tools, intelligent agents and feedback facilities and Cops dedicated portals with real time functionalities. In this case we have two distinct categories:

(1) software offers dedicated services (information and collaboration services) at communities of practice;

(2) software designed to assist knowledge management;

In the first category, collaboration tools are a central place (often referred to as groupware) where most package comprise an information repository (that can be accessed by Cops members who can collaborate working on common documents and can hold electronic discussions to learn or to develop new practice and expertise) or integrated calendar, group schedulers, e-mail notifications, e-conferencing facilities or other real-time meeting support. The second category provides solutions for creating centralized repositories for storing, sharing, retrieving and reusing knowledge where the deployment of semantic mark-up together with the ontology provide the formal specification of a knowledge domain to make explicit any domain assumptions. That's mean they integrate storage, communications and collaboration services into a single environment.

B). What functions or functionalities does the community require?

Maybe a good idea is to create a list of features (supported by explanation of the functions and options of tools) to be used to help potential users identify their expected needs by distinguishing essential, useful and non essential features. In this way, it makes sense in selecting software for one type of community as far as possible to look for a system that was developed with that type of community in mind. In the core of any tools, the conversation space is vital to the success of a potential community. We can identify a non exhaustive list of functions with different attributes linked to basic activities described above in figure 1:

Discussion

1. **Asynchronous communication** with e-mails based systems and bulletin board systems (we would need to address in the communities the development of operating protocols as to how it is used to ensure that is not used negatively) and **synchronous communication** like chat, instant messaging, e-conferencing (audio-video) with awareness functionalities.

Group work

2. **News and announcements** (are posted in different channel except the asynchronous channel) and **alert, calendar and task list**. Alert is an alternative approach to making people aware of changes (notification' systems). Calendar can be used as a record of events and to alert users of community events or outside world. Task list or activities list of the community (can be integrated with the calendar and alert features).

Research in area of interest and expertise

3. **Membership directory** develop the ability to encourage users to share information about themselves, such as their areas of expertise, interests and work experience, and so connect people and **contact lists** to encourage users to share contacts through a dedicated contacts directory (some members will find the real value of the community is to be able to access expertise).

4. **Link store** encourages members of the community in the ability to add links to share online resources (the system that have the ability to create folders or subfolders with clear headings, short description, the dates it was created, linked to an ontology) or to share a bookmarks.

Searching and Reusing information

5. **Searching and reusing information**. The search facility should be ideally (full-text) be able to search (by type of file) all internal documents, links and messages and archive or external.

Group work, Publishing and Library

6. **Product of documents** and **document repository** are two important features of a collaboration system. In the community is useful and fair to have

standards about which authoring software is used and in which format to produce the documents (email files, a long-threaded discussion or a specific document). In this case metadata linked to ontology is required and a full document management system with check-in and check-out of documents and version control, and an archive of previous versions.

Coordination of activities

7. **Polling** is a powerful tool for helping communities to foster active participation and even to make collective decisions.

8. **Awareness, user tracking and statistics.** This feature, useful in **workflow** or **project management**, sign offs or record management, assure information, for example, about who was using the system, how often they logged and in what time of day and especially what proportion of the community members who reads discussion groups does not actively participate.

9. **Usability, customisation and security.** The speed of the response times or to save one's password as a cookie on one's own machine may be a key to use of the system. The ability to personalise the environment by choosing a theme (public interface) or a language for layout and a good help of use of tool or FAQ increase the integration of the tools in the Cop' activities.

These functions described here could be useful to evaluate the software they have been used in a community building, and to triangulate with the results of actual user behaviour captured through statistics or direct observation of behaviour. In conclusion, the Cops' activities supported by the tools described below can be defined thus:

- To bring together the members of a community
- To identify and manage competences: Who knows what? Who does what?
- To capitalize knowledge and to share the good practices
- To work in project mode within a network trade
- To exchange with the other members and the experts
- To support cross collaborations with the profit of the innovation
- To develop the feeling of membership

3. Tools' selection

The selection of the most appropriate technology in the form of an integrated or specific tool is a significant part of creating and facilitating a community and is directly linked to CoPs requirements. While many communities are supported by Web sites providing knowledge sharing by means of online libraries, knowledge centres, specialist databases, information repositories, only a few of them get the fully necessary support. Technology platform are often described in terms of features, but in order to really evaluate this technology by a user perspective, it is

useful to start with analysis of existing tools.

Some of the software platforms presented bellow, designed to assist communities of practices, provide dedicated support able to offer CoPs the required IT facilities. The list of the products is only representative of the range of services available, but is by no means exhaustive. Analyzing these products yields not only a scan of products, but also a way of understanding the various aspects of a knowledge strategy based on communities of practice and how a this technology, more and more used by CoPs in virtual environments to support their activities, can affect the success of a community in each area of interest.

In the first category *software offers dedicated services* for CoPs we have some software suites who provide supportive of social structures, knowledge exchange and documents and contained taxonomy, a local search, an experts database, discussion and an events notification facility or community governance and polls or a limited virtual meeting space (audio or video-meeting).

1. **iCohere** [iCohere 2007] provide Web collaboration software tools for online communities, project teams and distributed organizations. Is available as a hosted application on the iCohere servers or for use in the customers' own servers as a site licence and claims advanced security considerations. This collaborative community software integrates all of the most critical community-focused features: online discussions, instant messaging, document management, and searchable member profiles, web conferencing and streaming PowerPoint presentation, etc. This technology enables engaging member communication and networking (relationship building), knowledge sharing and building, project collaboration and learning and development. In the table 1 the company provides which allocates core technical features to each focal primary area of activity of most CoPs.

CoPs activities	Core Technical Features
Relationship	Member networking profiles; Member directory with "relationshipfocused" data fields; Sub groups that are defined by administrators or that allow members to self-join; Online meetings; Online discussions
Learning	Recorded; PowerPoint presentations; E-learning tools; Assessments; Web conferencing; Online meetings: Online discussions; Website Links
Knowledge	Structured databases; "Digital stories"; Idea banks; Web conferencing; Online meetings; Online discussions; Expert database and search tools; Announcements; Website Links
Actions	Project management; Task management; Document collaboration; File version tracking; File check-in and check-out; Instant messaging; Web conferencing; Online meetings

Table 1 Core technology features

2. **Tomoye Simplify** [Tomoye 2007] platform offers a similar set of resources but not community governance and polls. It provides login facilities and membership privileges, customisation, navigation via bookmarks, threaded discussion forums and instant messaging, e-mail lists and digests, FAQs, content

ratings and search for knowledge and experts by a search engine over an XML database that includes multimedia content. Users can further subscribe to a subject of interest and receive regular e-mail updates, digests and links to new related objects.

3. **Knowings** [Knowings 2007]. The portal personalizes the accesses of users according to their roles (reader, author, expert...), language (multilingualism), responsibilities, centers of interest and competences. Finally of powerful search engines facilitates the access to relevant information. This portal proposes a complete solution of management of knowledge, of management of contents and collaborative work for CoPs: to collect, organize and manage the contents; to share and diffuse knowledge; to capitalize and transmit the experience; to automate their operational processes; to cooperate remotely and in asynchronous times; to cross competences and to enhance the cooperation.

In the second category, *software designed to assist knowledge management* we found some collaborative computing technologies used in the support of KM that also can be put into use with CoPs.

1. **Open Text LiveLink** [OpenText 2007] for Community of practice provides weblogs, FAQs, webcasts, an experts database, forum with threaded discussions, and role-based permissions for community users so that they can perform specified activities.

2. **SiteScape** [SiteScape 2007] provides both synchronous and asynchronous communication facilities, document management, shared scheduling, and instant messaging, asa well as a number of task-and process-based tools. Web meetings, white boards, videoconferencings are also supporting.

3. **iLevel Software** [iLevel 2007] provides solutions that enable teams to collaboratively manage the entire lifecycle of business content using a unified, tightly integrated platform and repository. The tool offers extensive XML content management, Web-based document management, Web content management and intranet / extranet access to business information, but also a number of services that improve knowledge exchange and retrieval such as enterprise search, categorisation facilities, alerts, and collaborative capabilities.

4. **AskMe Enterprise's** [AskMe 2007] Community Services provide a comprehensive set of tools to foster and manage cross-boundary communities of practice. These include one-stop community pages where CoP's members can interact and share ideas with people who share an interest in their discipline, features such as subscriptions and incentives that drive community usage, and community management capabilities that enable COP leaders to oversee communities, set permissions and security, and drive activity. The key benefits of this tool:

- One point of access to the people, frequently asked questions, and documents employees need to solve critical business problems.

- Reduces re-invention by capturing solutions in a searchable knowledgebase.
- Fosters x-boundary connections and drives innovation by creating communities across geographical, departmental, and divisional barriers

4. Elluminate Live! [Elluminate 2007] is real-time e-learning and web collaboration tool built specifically for live, multimedia collaboration. This solution is proposed in three versions: Enterprise Edition (a live web conferencing environment for virtual meetings and remote training, with the ability to support dozens to hundreds of users), Academic Edition (a highly scaleable e-learning and collaborative environment for use by academic institutions), and Lite Edition (with basic functionality that includes full-duplex audio, interactive whiteboard, instant messaging, and advanced, yet easy-to-use, moderator tools). For example, in interaction to asynchronous distance learning, tutor and students communicate via full-duplex audio, life video, or text chat; write or draw on the interactive whiteboard; and share images, documents, and PowerPoint presentations. Tutors or professors can demonstrate a procedure via live webcam, show a high-resolution video, or take students on a guided web tour. Students can do small group work in breakout rooms, with separate audio, whiteboard, and text messaging, and come back together in the main room to present results to the entire class. Instructors can monitor student status with advanced moderator tools, conduct informal polling, and deliver ad hoc or previously developed quizzes. In this view, the tool is an interactive environment specialized for online meeting and training.

Our purpose was not to make an exhaustive list of the tools and their useful functionalities for the development of tools for CoPs, but only to bring some elements of reflections on "what is done" elsewhere.

5. Conclusion

Sometimes, using this technology where face-to-face member interaction can be substituted by virtual contact to various degrees, information manipulation still poses a significant obstacle to the flow of the information inside these communities. The emergence of the Semantic Web seems to improve the development of tools for the automated capturing, sharing, and retrieval of information. Hence it is necessary to look at the social implications of technology support for CoP activities. Adopting this perspective we have to contribute to adaptability, acceptability and accessibility of the tools and services. From a user perspective that means the interoperability is the ability of system to work together, to "plug-and-play" without any hassles. In the lights of the two categories of software presented, a possible technical solution to these demands seems to be tailoring. Tailoring is "the activity of modifying a computer application within the context of its use" [Mørch et al., 1998]. In other words, it is the adaptation of a system performed by its users while using it, in order to satisfy the needs that were not properly accounted for in the original "version".

Considering the specific case of CoPs activities system, tailoring could take the form of modules or features which can be added to or removed from the system by its administrator or final users. The promotion of such technical solutions as tailoring for example imply, beyond the interoperability of system, the necessity to depict the user perspective about tools functioning.

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A la recherche de méthodes pour comprendre l'apprentissage et le développement des CoPs

Conférence EIAH 2007 (Environnements Informatiques pour l'Apprentissage Humain)

Chair: France Henri

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1. Introduction

Cette table ronde rassemble quatre jeunes docteurs ou doctorants ayant choisi de mener leurs recherches doctorales avec, pour ou sur les communautés de pratique. Les échanges leur permettront d'apporter leurs réponses à des questions comme :

- Pourquoi s'intéresser aux communautés de pratique ?
- Comment définissez-vous ces communautés ?
- Dans votre recherche, quels sont les questions et concepts centraux ?
- Quelle(s) méthode(s) avez-vous adoptée(s) et pourquoi ?
- Quelle place occupe l'instrumentation des communautés dans votre recherche ?

Question et méthode de l'étude du partage pédagogique au sein d'une communauté universitaire

Caroline Brassard

Le partage pédagogique est une tendance de plus en plus présente dans les pratiques enseignantes à l'université. En effet, des enseignants universitaires tentent de transformer et d'actualiser leurs pratiques. Pour ce faire, certains s'investissent dans un processus de partage pédagogique au sein de communautés de pratique. Ce partage est, à l'occasion, soutenu par un environnement virtuel.

Dans le but de comprendre ce partage, une communauté de pratique d'enseignants universitaires a été observée. La question à la base de l'étude se libellait ainsi : Quelles sont les composantes et les conditions du partage en enseignement universitaire soutenu par un environnement virtuel ? Afin d'y répondre, il fallait identifier les composantes et les conditions du partage au sein d'une communauté de pratique utilisant un environnement virtuel en enseignement universitaire et ensuite les modéliser.

Une recherche développement émergeant sur un modèle a été effectuée (Loiselle, 2001). Le recueil de l'information visait toutes les traces du partage et des savoirs d'expertise. Les traces du partage renvoient aux données numériques colligées à partir de l'environnement, le courriel et le forum. En effet, pour analyser l'activité d'une communauté de pratique, l'observation systématique en différé des comportements verbaux écrits et du produit de réification est nécessaire (Pudelko, Daele et Henri, 2006). Quant aux savoirs d'expertise, ceux-ci sont accessibles par le biais d'entrevues semi-dirigées car le sujet explicite son vécu (Savoie-Zajc, 2003). La collecte des données s'est effectuée en continu durant un trimestre, générant une grande quantité de données mais permettant de préserver la richesse du contexte (Pudelko et al., 2006).

La méthode d'analyse des données est qualitative (Van der Maren, 1995). Une analyse de contenu des données provenant des diverses sources a été effectuée, les constantes ainsi que les particularités ont été dégagées et croisées. Ces choix ont été retenus afin de permettre une analyse en profondeur du partage. Pour l'analyse des

données, une grille de codage a été élaborée au départ à partir d'éléments théoriques pour catégoriser le contenu des diverses sources de données. Par la suite, une analyse de contenu par catégorisation (Bardin, 1983; L'Ecuyer, 1990) a été effectuée. Ces catégories d'analyse ont été construites selon le modèle C de L'Ecuyer (1990) sur la base des données recueillies.

Précisons également que la source des données a été retenue pour étayer notre analyse. Ainsi, les résultats tirés du forum et des courriels ont permis de mettre en lumière les pratiques authentiques des enseignants tandis que les résultats issus des entrevues ont permis de comprendre ce que les enseignants ont rapporté sur leurs pratiques. Cette complémentarité des sources a augmenté notre compréhension du partage au-delà des simples faits observables à travers les traces électroniques. Dans le cas de notre étude, il importait de faire le plus large portrait possible du partage. Cette façon de faire nous a permis d'avoir un modèle plus complet et davantage transférable.

Sociabilité et conflit sociocognitif vécus au sein de communautés virtuelles d'enseignants

Amaury Daele

La problématique dont il est question dans ce projet de thèse touche à celle des conditions du développement professionnel d'enseignants participant à une liste de discussion par courrier électronique. Cette problématique est ancrée dans les études menées depuis un certain nombre d'années à propos du développement professionnel des enseignants dans un contexte de groupe. Ces recherches ont mis notamment en évidence l'importance, pour l'apprentissage du métier d'enseignant, d'entrer en contact avec des collègues, d'analyser et de parler de ses pratiques… et ceci pour des raisons d'accessibilité des savoirs, de validité des pratiques échangées et de sécurité dans la relation professionnelle (Charlier, 1998 ; Day, 1999 ; Huberman, 1986). Dans les formations formelles initiales ou continues des enseignants, beaucoup de formateurs ont tiré parti de ces connaissances sur l'apprentissage de l'enseignement et privilégient ainsi les échanges de pratique et la réflexivité en groupe.

Mais parallèlement aux formations formelles, les communautés virtuelles relèvent plutôt de l'informel : il n'y a pas toujours de cadre institutionnel, la forme des échanges d'expériences ou de documents dépend des modes de communication et des technologies utilisées, les contenus des conversations sont souvent en prise directe avec le vécu professionnel immédiat des participants, l'implication dans les échanges est le plus souvent libre, il n'y a pas de lieu ni d'horaire fixés pour des réunions, etc. Nous touchons ainsi à plusieurs questions si l'on tente de comprendre non seulement le fonctionnement de ce type de dispositif mais aussi les motivations des enseignants à y participer et ce qu'ils en retirent pour leur pratique : comment une communauté virtuelle d'enseignants se définit-elle, se construit-elle au fil du temps ? Que viennent y chercher les participants ? Qu'y trouvent-ils par exemple de différent que dans une formation continue ou que dans les discussions qu'ils peuvent entretenir avec leurs collègues proches ? De quoi parlent-ils ? Que s'échangent-ils ? Qu'y apprennent-ils ? En quoi leur participation contribue-t-elle éventuellement à leur développement professionnel ? Comment identifier des conditions d'entrée, de participation et d'apprentissage pour les participants ?

Une recherche exploratoire (Daele, 2004 ; Daele 2006) nous a permis de construire un modèle théorique du développement professionnel et de le valider au

travers d'une analyse de fils de discussion dans une communauté virtuelle d'enseignants et d'interviews menées auprès de plusieurs membres de cette communauté.

En conclusion de cette recherche, la question principale qui apparaissait était celle des conditions d'émergence et de résolution du conflit sociocognitif au sein d'une communauté virtuelle d'enseignants et plus particulièrement parmi ces conditions, la sociabilité : « la sociabilité pourrait être aussi étudiée en tant que condition pour l'émergence d'interactions sociales positives et suivies favorables à l'émergence de débats et de conflits sociocognitifs » (Daele, 2004, p. 123). La question centrale de notre recherche doctorale est donc « En quoi la sociabilité construite au sein d'une communauté virtuelle constitue-t-elle une condition pour l'émergence de conflits sociocognitifs et pour la résolution de ces conflits à un niveau cognitif ? ».

Pour répondre à cette question, la collecte et l'analyse des données se focalisera d'une part sur les représentations personnelles de l'expérience d'apprentissage à travers la participation à une communauté virtuelle, en portant une attention particulière à la condition « sociabilité » et d'autre part sur des fils de discussion qui « font débat » au sein de la communauté. Le terrain d'étude est une liste de discussion par courrier électronique à laquelle sont inscrits environ 300 instituteurs et institutrices, issus pour la plupart d'écoles francophones belges.

Interactions sociales et expérience d'apprentissage en formation hybride

Nathalie Deschryver

Les dispositifs de formation « hybrides » sont une des nouvelles modalités de formation dans l'enseignement supérieur. Ils articulent des phases présentielles et à distance et sont soutenus par un environnement technologique (plate-forme, portail, etc,). Il existe différentes configurations de ces dispositifs que nous tentons avec des collègues de mettre à jour dans des travaux en cours (Charlier, Deschryver, Peraya, 2007, à paraître).

Impliquée dans ces dispositifs depuis 1997, nous avons pu constater des contraintes fortes pour les étudiants imposées par des situations impliquant une interaction sociale à distance, et plus particulièrement dans des situations d'activités de groupe. Nous nous sommes ainsi régulièrement interrogée sur le sens que prenaient les situations d'interaction dans ces dispositifs pour les étudiants, quel rôle elles prenaient dans leur apprentissage. Parallèlement, une recherche sur notre pratique de tutorat dans un dispositif de formation collaboratif à distance nous a permis de mettre en évidence l'importance de l'accompagnement soutenant ce type d'activité. Cependant, la situation habituelle de l'enseignement à l'université fait le plus souvent montre de ressources limitées en matière d'accompagnement.

Ainsi l'objet de cette recherche en cours (Deschryver, 2004) consiste à interroger le rôle que prennent les interactions sociales dans l'expérience d'apprentissage des apprenants. Quelles interactions vont-ils privilégier dans leur expérience d'apprentissage : des interactions socio-cognitives ou socio-affectives, à distance ou en face à face, avec les formateurs, les pairs ou d'autres personnes ressources, des interactions formelles ou informelles ? Est-ce que ces modes privilégiés d'interaction peuvent se comprendre à travers certaines variables individuelles (motivation, expériences antérieures d'apprentissage, contraintes ou ressources de l'environnement social) et la perception du dispositif de formation (présence sociale, charge de travail, etc.) ?

Les réponses à ces questions de recherche devraient nous permettre de formuler des hypothèses quant aux conditions d'efficacité des dispositifs de formation hybride pour le support des interactions sociales : les variables individuelles importantes à prendre en compte, les caractéristiques des environnements technologiques, les interactions à privilégier à distance, celles à privilégier en présentiel, etc.

Nous avons étudié les expériences d'apprentissage d'étudiants impliqués dans deux dispositifs de 3e cycle universitaire. Les modes d'interactions privilégiés sont étudiés à travers ce qu'ils disent de leur expérience d'apprentissage, à trois moments de leur formation sur une période d'un an : « Décrivez une situation dans laquelle vous avez le sentiment d'avoir appris ? Décrivez une situation dans laquelle vous avez le sentiment de ne pas avoir appris. »

L'expérience d'apprentissage d'une situation d'apprentissage collaborative à distance est également interrogée en cours de formation : « dans cette situation, qu'avez-vous le sentiment d'avoir appris ? que s'est-il passé ? ».

Pour comprendre ces expériences d'apprentissage, les variables individuelles (motivation, expériences antérieures, facteurs sociaux) et la perception du dispositif de formation sont également interrogées.

Ce questionnement des interactions sociales dans l'expérience d'apprentissage peut être intéressant et pertinent dans le domaine des communautés : quelles situations font sens pour les membres de la communauté en termes d'apprentissage et quelle rôle y prennent les interactions sociales ? quel lien avec leur perception du lien social dans la communauté ?

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« Du réseau à la communauté d'apprenants.

Quelle dynamique du lien social pour *Faire œuvre* ? »

Mélanie Ciussi-Bos

Cette thèse vise à éclairer les conditions et les processus à l'oeuvre dans l'actualisation d'un réseau en une communauté d'apprenants dans les espaces de-territorialisés que sont les campus virtuels.

Elle s'interroge sur les questions suivantes :

- Comment distinguer les réseaux des communautés, et comment identifier les facteurs d'émergence des communautés d'apprenants ?
- Quelle est la place des échanges socio-affectifs et socio-cognitifs dans la construction de l'identité qui forge une communauté d'apprenants, au sein d'un dispositif de formation intentionnellement crée l'enseignant?

Nous avons choisi d'aborder ces questions par l'étude du lien social médiatisé (porté par le lien technologique) qui unit les membres d'un collectif en ligne (réseau ou communauté). Plus précisément, il s'agit d'étudier les conditions de *passage* d'un *réseau* à une *communauté* d'apprenants selon la *force du lien social médiatisé* noué au sein des dispositifs de formation à distance. Plus le lien est faible, plus les échanges sont de type fonctionnels (FAQ[1]). Ils sont majoritairement présents dans les réseaux sociaux. Plus le lien est fort, plus les échanges portent une charge émotionnelle intense (échanges socio-affectifs et socio-cognitifs) qui semblent favoriser le développement d'une identité commune, d'une «micro-culture» (Audran et Daele, 2006), caractéristique essentielle d'une communauté.

Dans une première partie, une modélisation des liens selon deux axes bipolarisés est proposée (lien faible *vs* lien fort d'une part, présence *vs* distance d'autre part). Elle permet une première approche typologique des liens sociaux ainsi qu'un

[1] Foire aux questions

positionnement relatif du réseau et de la communauté. Dans la seconde partie, le cadre conceptuel théorique s'est orienté, au delà des conceptions traditionnelles de l'apprentissage, vers la compréhension d'un « faire ensemble », et plus particulièrement d'un « faire œuvre » qui semble être au coeur des processus d'apprentissage autant individuels que collectifs vécus par les membres d'une communauté. En effet, les membres partagent des valeurs jusqu'à la *création* d'une identité culturelle commune. *Faire œuvre* étant entendu comme ce processus de création (« *action de donner existence, organiser une chose qui n'existait pas* »[2]) individuel mais aussi collectif qui anime les participants d'une communauté. La communauté est également entendue comme une œuvre collective, l'œuvre étant le *« résultat sensible de l'action »*[3]. Dans une troisième partie, la démarche méthodologique ethnologique a été choisie pour favoriser l'insertion du chercheur dans la culture locale. Les *actions* et *interactions* des apprenants ont été étudiées à travers une enquête en ligne et une étude de contenu sur un corpus de 591 messages (forum de discussion et chat). Les rites d'*interaction* qui traduisent les phénomènes culturels de construction identitaire des communautés ont été analysées selon les phases d'évolution socio-discursives décrites par Audran et Daele (2006). Dans la dernière partie, l'interprétation des résultats et les perspectives de recherche ont notamment mis à jour le paradoxe de l'émergence des communautés d'apprenants en terme de « dissonance dispositive ». La dissonance, déséquilibre entre le *dispositif* intentionnellement crée par l'enseignant et la *situation* pédagogique vécue par les étudiants (Audran, 2006), dévoile en effet le caractère auto-organisé et informel des communautés qui sont avant tout autopoiétiques (Varela, 1989) .

Les nouvelles pistes de réflexion au coeur de notre étude sont:

- Comment atteindre l'équilibre entre le lâcher-prise nécessaire à l'émergence communautaire et le contrôle exercé par l'enseignant?
- Comment éviter des dissonances dispositives trop importantes pour se recentrer sur le coeur des communautés: les tâches collectives orientées vers des débats socio-cognitifs?

Ceci signifie qu'au delà de la structure émergente, il est important de se recentrer sur les tâches de nature collaboratives, car « *peut-être, sous-estime-t-on la difficulté qu'il y a à travailler de manière productive et à plusieurs, en particulier dans les communautés d'apprentissage formel* » (Baron, 2006, page 193).

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[2] Définition du Littré : processus de création

[3] Définition du Littré