A model for representing professional development through the participation in a virtual CoP: uses for developing enhanced services

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Abstract. This paper presents a model of professional development through the participation in a virtual CoP. This model is rooted in a definition of professional development and of professional practice. The model is then used for analyzing the activity of a virtual CoP of tutors involved in a computer-supported collaborative learning training. The analysis provides guidelines for developing online services for supporting the activity of the CoP within a participatory design view. This research is part of a European project aiming at providing interoperable services for CoPs.

Keywords: community of practice, professional development, practice, modelling, R&D methodology, participatory design

Introduction

The call for papers of this workshop, in its 'motivation and background' section, pointed out that, despite to the development of new devices and services able to sustain the development of virtual CoPs, research underlines "the lack of adequate scaffolding in the form of both technical supports and usage of technology to:

- Express, represent and share practices;
- Debate and reflect about the practices and about the life of the CoP;
- Develop, reify and exploit knowledge inside and outside of the CoP;
- Facilitate engagement, participation and learning."

More than the lack of use of technology, this assessment also highlights the lack of understanding of the main processes underlying the functioning of a CoP as well as the learning achieved by the participants. Research has also identified many questions highlighting the difficulty to depict and to understand the conditions of processes such as involvement into a virtual group [8], debating and arguing at a distance [2], coordinating a virtual working/learning group [3], supporting confidence and human relations into a distributed community [17], etc. In addition, methodological questions also occur for inquiring into those groups [16] [9]: how to get in touch with the members, how to analyse in the same time different data such as interviews, emails or logs, how to validate the research approach, etc.?

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It is usual to notice non- or "wrong" uses of new technologies [6] [15]. But this does not necessarily mean "wrong" technologies or "wrong" users. This would rather mean "wrong" relation between the technology and the users or a lack of understanding of their way to work with – or without – technology. Quite often, old technologies are used for new purposes or activities for which they have not been designed. If they don't work, it is not common to question the new purposes or activities themselves for better understanding them before to design new technologies or supports for the users.

When investigating a new research field, scientists usually firstly try to develop a general depiction of the processes and questions they intend to inquire into [18]. A first modelling aims at identifying main categories of meaning into the reality and to conduct exploratory research. Then validation or change of the first model can be done and new questions of research can occur.

The model presented in this paper aims at representing the main processes occurring into a virtual CoP, their connections and the conditions for their emergence and for the professional development of the participants. Then a use of the model will be presented into a European R&D project (PALETTE) for investigating one virtual CoP and exploiting this investigation for designing enhanced online information, knowledge management and mediation services.

1 Professional development and practice

Before the presentation of the model, it is important to define the two main concepts behind.

Several authors consider more and more professional development as a process supplied not only by prior training but also by interactions with professional peers and by personal reflexivity in and out the workplace [5] [12]. For example, a teacher develops her practice as professional in almost all the circumstances of her life, formally or informally, alone or in interaction with others, in or out her school. Lieberman (1996, quoted in [5], p. 3) gives some varied examples such as to hear colleagues speaking about new teaching practices, to get involved in decision groups in her school or to participate in professional networks. Outside school, she gives examples such as to participate in institutional working groups, to get involved in action-researches with universities or to participate in discussion groups. All these examples can take place into formal training but also in informal situations. More precisely, Donnay and Charlier [7] propose to define professional development with six specific characteristics. These authors have worked in the teachers training field but their definition is largely applicable to other professions. Professional development is a process:

- oriented: towards a goal, a project, a progress… that may be personal (one's own practices) or larger (the project of the institution);
- situated: embedded into a specific context composed of work situations, relations with colleagues, an institutional history and a particular functioning and organization;

- that can be partially planned: it is relatively unpredictable because in the most of professions, professionals are assailed by requests from different people or devices. Professional learning can occur at each moment.
- dynamic and continuous: learning that has been achieved is reused in new daily professional situations and continuously enhances professional doing;
- sustained by a professional ethic: professional development occurs for improving a service, for example the students learning, the quality of products or the quality of services to customers;
- with shared responsibility: the professional is responsible for her professional development but her organizational environment is responsible for providing her professional development opportunities.

These characteristics highlight the informal aspect of the development of professional practices. Indeed, Donnay and Charlier [7] also describe four dimensions of professional development:

- the professional practices are often the starting and the arrival points of professional development that acts for enhancing them;
- professional development is often anchored in or even becomes confused with personal development;
- professional development lives on otherness: confrontation, debate, sharing, etc.
- professional development is related on the construction of professional identity.

Within these characteristics and dimensions, collaborative work and participation in a professional community appear as important actions for the professional development process, especially for confronting and improving one's practices. This implies that practice is at the heart of professional development or, following Donnay and Charlier [7], constitutes both the starting point and the arrival point of the process of professional development. According to Wenger ([19], p. 47), "The concept of practice connotes doing, but not just doing in and of itself. It is doing in a historical and social context that gives structure and meaning to what we do. In this sense, practice is always social practice". Thus practice includes the formal and the informal of a profession: representations, tools, language, documents, symbols, roles, etc. The action and the knowledge of a profession as well as the processes by which they have been constructed are also components of the practice. The Wenger's definition also includes the theories and the ideals relating to a profession as well as the actions and operations characterizing the practical doing of this profession.

Donnay and Charlier [7] otherwise highlight the difficulty to understand what professional practice or know-how is concretely because it is:

- not always available for the professional: it is constructed, alone or with colleagues, 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.

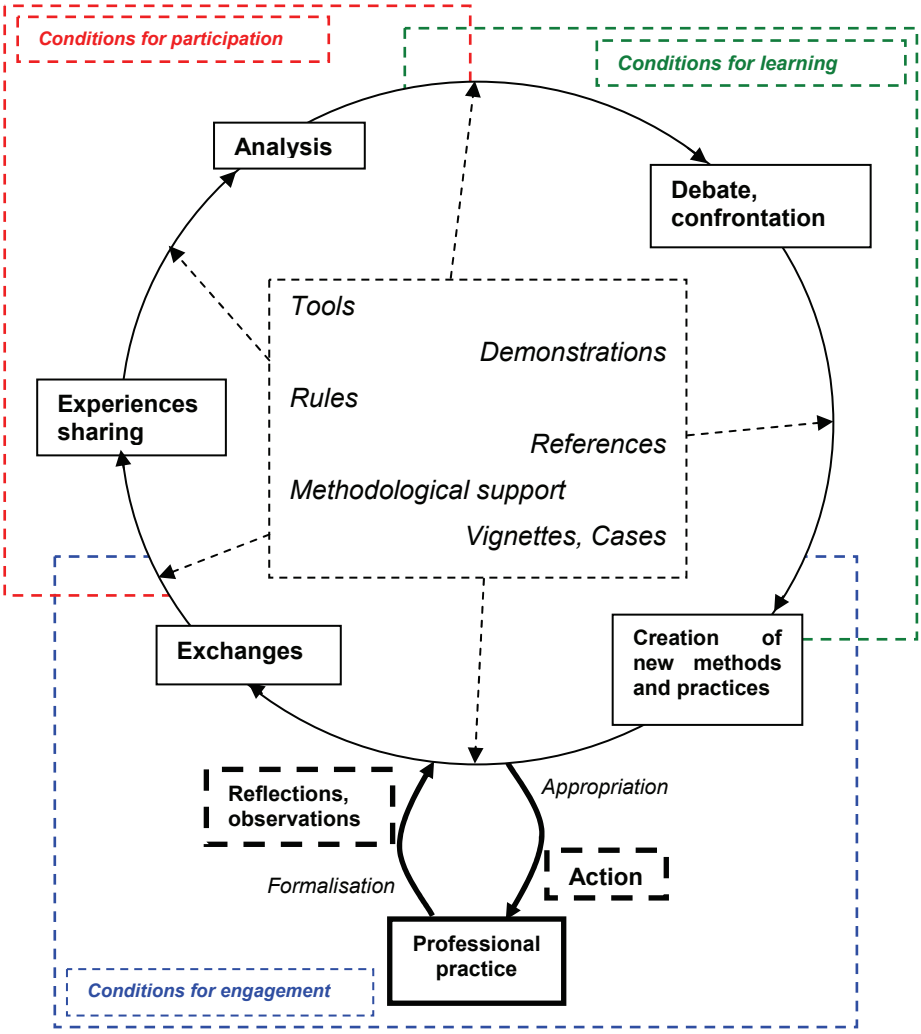

Fig. 1. Model of professional development within a community of practice

All along this cycle, participants can use and exchange objects such as:

- Tools (technical and conceptual) used in specific contexts and exchanged by the participants;
- Rules or references to regulations (administrative or legal for example) or to standardized practices classified by the profession;
- Methodological support such as advices from older colleagues;
- Demonstrations, i.e. argued discourses possibly based on literature;
- References to literature or to well-known standardized doing;
- Vignettes or cases such as little stories or anecdotes.

- 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.

This large definition allows conceiving a model of professional development taking into account the complexity of a professional practice.

2 A model of the professional development within a CoP

In order to represent the different processes in action into the larger process of professional development, I built the model presented in the figure 1 [2], mostly based on the Huberman's *'Open' collective cycle* [10].

The entry point is the Professional Practice below the model. It is also the arrival point. At the workplace, a professional can encounter problems, ask questions, observe colleagues doing… in short, an event that arouses a reflection, not necessarily expressed but sufficiently explicit for leading her towards the community (the black central circle in the model). The practice is then formalized and "enters" into the community as an object which will be discussed.

Within this community, five processes occur from the interventions of the participants. In the model, they follow one another but we can imagine that they can occur independently or in another chain.

- Exchanges occur when a participant asks a question or proposes an observation made at her workplace or a problem. The exchange can be a question asking more information, a reformulation, a personal observation in another context, etc. "Exchange" is thus generally an answer to a message that can lead to a dialogue.
- The exchanges can lead to experiences sharing where participants develop their observations or their descriptions of their own contexts. Here, the answering participants get more personally involved in the conversation.
- An analysis can then occurs, i.e. a specific identification of what is exactly the problem, or a reference to literature or standard practices for explaining the problem or the practice described. Participants can then look for solutions together.
- The analysis can lead to a debate where different opinions are confronted with lines of arguments.
- A debate can possibly lead to the creation of new practices that the participants will try in their context. This leads then to action and appropriation by the participants in their workplace.

All these processes occur following a number of conditions. Three kinds of conditions occur before, during and after the participation in the community. For each participant, they combine together for defining, at one moment a specific configuration of variables that explain participation or learning.

- Conditions for engagement are related to personal characteristics of the participants, competences in the use of technologies, access to technologies, usual work environment, communities in which they take part and relations between those, personal representation of what is a community of practice, representation of one's professional development and learning processes, practices of reflexivity, etc.
- Conditions for participation are associated to personal characteristics (such as time available for participation, self-esteem, representations of one's competencies), participation support (such as animation and moderation of the community, rules for participation, framework given at the beginning to facilitate the exchanges between participants, usability of the tools, support to the new members), common project, security and trust issues, and shared language (own vocabulary developed within the community to speak about practice).
- Conditions for learning, professional development and changes of practice concern conceptions of learning, conceptions of changes, as well as conceptions of the community, the formalization of the exchanges, the role of the moderator to support individual learning and learning of the community and scaffolding opportunities to reflect on the learning process, and on the learning organisation.

This model can be used as a framework or as a grid of analysis for observing and understanding living CoPs.

3 The PALETTE project and its method

The PALETTE project[1] (6th European framework programme) aims at facilitating exchanges and learning in CoPs by developing online services and scenarios of use which will be implemented and validated with living communities. These services concern information management, knowledge management and collaboration. One of the original aspects of the project is that it is based on a participatory design methodology. Eleven communities of practice from three different domains (teaching, management and engineering) are actively involved all along the project through participative activities: interviews, tests of services, discussions about the designed scenarios, etc.

In this framework, there was a need of a clear vision of what a CoP is and how it works for professionally developing its members. This doesn't mean a "right" vision but a first well described vision for being discussed all along the project with the members of the communities involved. The model presented above was useful in this view and allowed to organize a first participative activity with the communities. A guide of interview has been designed with questions based in part on the processes, objects and conditions described in the model. Then the model has been used in part

[1] More information can be found at http://palette.ercim.org/.

for the analysis of the interviews. Finally the presentation of the analyzed data follows on the one hand the advices of Miles and Huberman [13] with the construction of matrices and on the other hand a specific methodology of knowledge modelling MOT, Modelling with Typed Objects [14].

In the section below, I present the analysis of the interviews of one community in the teaching domain. This community of practice groups tutors involved in distance training. These tutors discuss about the problems they encounter for tutoring their groups of students (future teachers in secondary schools) who have to work collaboratively on a specific project. In this paper, my goal is not to deeply analyse the functioning of this community but to simply show the usefulness of a model for understanding its functioning and further to design tools and services that take into account its real organization, as suggested in the introduction. So, I only take four examples, four "pictures" of processes lived by the community. Then I will discuss how these pictures can be used both for supporting the development of the community and for developing tools and services in phase with these "living scenarios".

4 Graphical representations of some results

The figure 2 simply depicts the documents produced or used into the community. This refers to the exchanged objects in the model presented in the figure 1. Three kind of actors are represented, two of whom are members of the CoP (the coordinator and the group of tutors and local coordinators); the students participate in the distance training organized by it. Nine sorts (link "S") of documents are produced by the large community while they use only two sorts of documents (scientific papers and bookmarks). The tutors and the coordinators participate in the production of researches, a pedagogical guide for the students and pedagogical tools for tutors. This last production is especially a product of the tutors' CoP. Thus this figure depicts a very productive CoP. However the bottom half of the figure shows that only one of the products is reused in the next years for designing new distance training scenarios. What the students produce is not reused nor researches or practical tools. This could depict a CoP without memory… while in the model of the figure 1 one condition of learning is precisely the organization of knowledge management and the formalization of the exchanges.

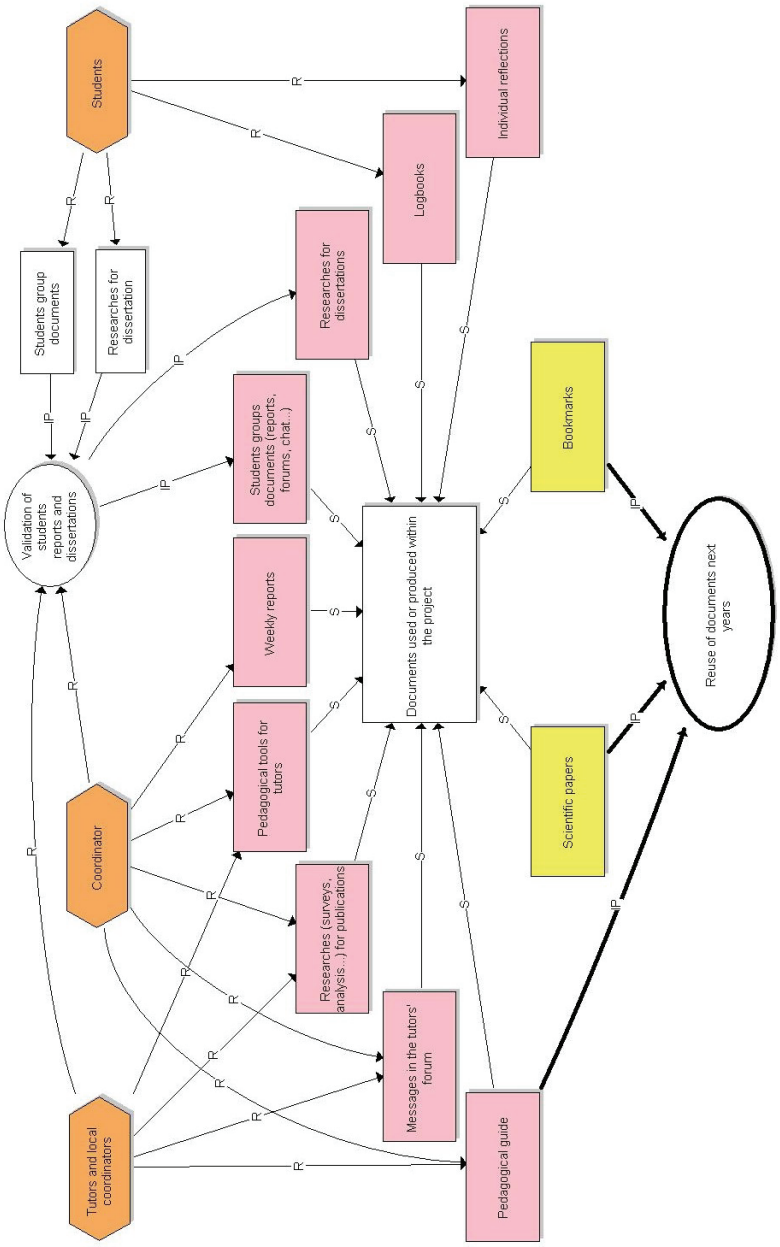

Fig. 2. Documents used and produced and actors involved

"R" means "Regulates" (or "has an effect on" or "acts on") "S" means "is a Sort of" "IP" means "Input/Product-Output"	= Processes, actions = Actors = Objects, products

The figure 3 aims at depicting the decision making process before the training project begins, i.e. before the students involved begin to collaboratively work, when preparing and organizing the training. The students (future teachers) are from different European universities and will form working groups. Three kinds of actors are involved: the tutors of the students groups, the local coordinators in each University and the coordinator of the project. A lot of topics have to be discussed: the enrolment of new universities, the platform to use, the pedagogical scenario, etc. The decision making process could be divided in 3 sub-processes:

1. Discussion in face-to-face meeting: different topics of discussion are selected into an agenda and the goal of the meeting is to organize the work for producing the scenario and sharing tasks. The product of this activity is a meeting report.
2. Following the meeting report, the tasks are shared and the actors work for proposing to the others draft documents.
3. A negotiation (comments and proposals of changes in the documents) then occurs for producing the final documents and organization which will constitute the architecture of the pedagogical scenario.

This process of decision making refers to the processes of analysis and debate in the model of the figure 1.

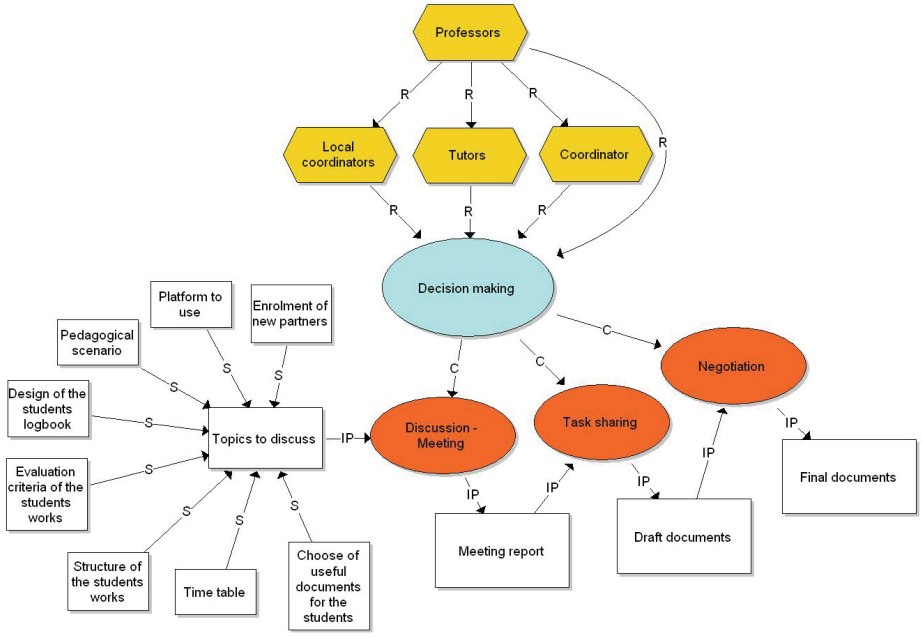

Fig. 3. Decision making process before the beginning of the training

"R" means "Regulates" (or "has an effect on" or "acts on") "S" means "is a Sort of" "C" means "is Composed of" "IP" means "Input/Product-Output"	= Processes, actions = Actors = Objects, products

However, during the project (figure 4), while students are involved with the tutors in working groups, decisions have regularly to be made relatively quickly. The normal and negotiated procedure is to organize monthly meetings with the tutors and local coordinators with an agenda based on problems, questions and topics that occur within the students working groups. A meeting report is written by the coordinator and information about the decision made is provided to all the participants (students, professors...).

However, it seems that sometimes, the project's coordinator has to make decision "on the fly", very quickly, for answering a specific question or because it would be too energy-consuming to organize a meeting with all the partners. Some interviewed people complain about this "parallel" process of decision making because they feel not involved in the process and they are not always informed about the decisions made by this way. This "hidden" decision making process is depicted with the dotted lines around the process "Decision by the coordinator".

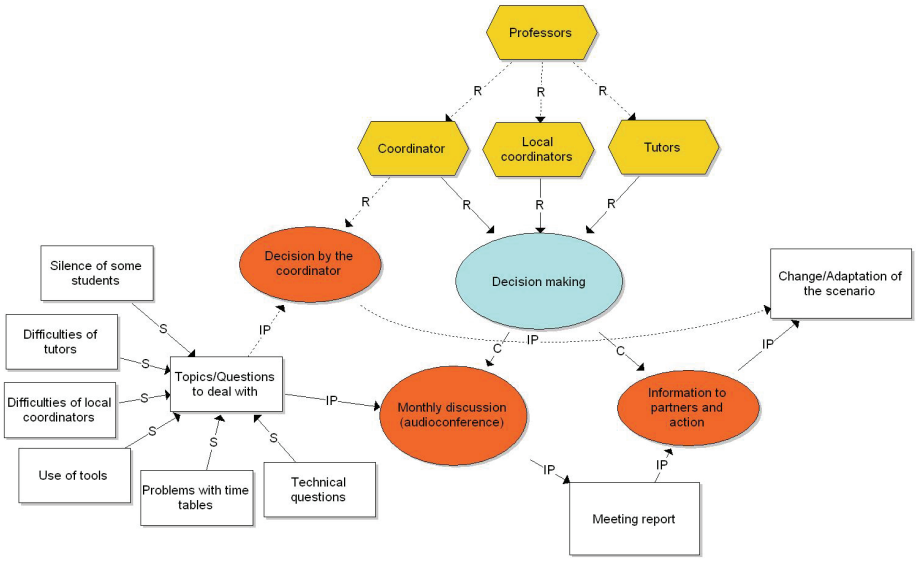

Fig. 4. Decision making process during the training

"R" means "Regulates" (or "has an effect on" or "acts on") "P" means "Precedes" "C" means "is Composed of" "IP" means "Input/Product-Output"	= Processes, actions = Actors = Objects, products

In the model of the figure 1, the coordinator (or moderator) of a CoP appears as a central element for the engagement, the participation and the learning of the participants. If the participants complain about the coordinator or if they don't trust in him/her, it could be a problem regarding the participation within the CoP.

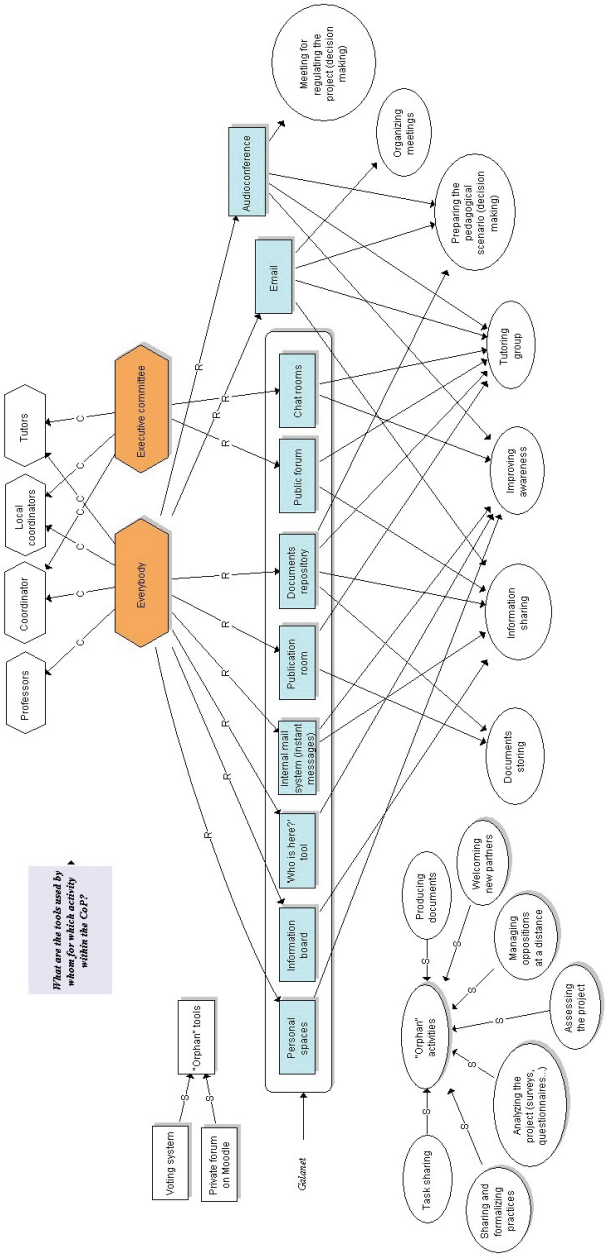

Fig. 5. Use of tools for activities within the CoP

"R" means "Regulates" (or "has an effect on" or "acts on") "S" means "is a Sort of" "C" means "is Composed of" "IP" means "Input/Product-Output"	= Processes, actions = Actors = Objects, products, tools

The figure 5 tries to depict three kind of knowledge:

- the tools used within the training project;
- the actors who use the tools;
- the activities supported by the tools.

Four types of actors are grouped in two categories: "Everybody" and the "Executive committee" for avoiding too much links between actors and tools. Height tools are integrated within the distance learning platform (Galanet). Two other tools are used: email (not a list of discussion) and audioconference (telephone). Two tools are "orphan" (= not really used): a voting system which was integrated within the platform but "let down" and a private forum for tutors which was not integrated within the platform. These 10 tools are used for specific purpose/activity (documents storing, information sharing, tutoring groups, organizing meetings, etc.). Seven activities are orphan: no tool is used for sustaining them.

For some of the orphan tools or activities, the interviewees complain: managing oppositions at a distance, producing (and searching for and into) documents, sharing practices and analyzing the project for improving it years after years. Globally, a question is asked: how to better organize or provide useful tools for sustaining the orphan activities?

In the model presented in figure 1, the use of tools appears as condition for engagement of the CoP's members (competences in the use of the CoP's tools and access to them) and for their participation (usability and acceptability of the tools). The tools used participate in the level of the members' comfort into the CoP.

5 Uses and perspectives

In the PALETTE project, these analysis and depictions of the functioning of the CoPs are used for two purposes. On the one hand, the researchers keep in touch with the CoPs and will organize with them other participatory activities such as discussions with focus groups or tests of services or scenarios of use of tools. With the figures 2, 3 and 4 presented here, the researchers could show to the CoPs how they understand their functioning and the questions they ask about it. Regarding the examples above, questions like "how to better reuse documents produced?", "does the decision making process satisfy everybody?", "how to enhance it if need be?", "which tools could support both the process itself and the communication of the decisions made to the participants?"… The CoPs involved in the project are voluntary and know that they possibly enter in a reflexive work. Discussions about these figures could help them to enhance their functioning.

On the other hand, these representations of the real functioning of CoPs will be used by the PALETTE's partners who develop services and tools. They are asked to propose services in phase with the functioning of the CoPs and interoperable with the tools they already use. Clearly, the analyses presented in the figures above could help them to have a specific vision about how a CoP can work and evolve. For example, the partners in charge of the development of knowledge management services could orient their work around the formalization but also the reuse of documents and knowledge within a CoP. In addition, the partners developing mediation services have

specific examples for proposing tools supporting argumentation and debate in order to make decisions.

From a participatory design point of view, these two uses of our analysis show that the researchers and the CoPs need each other for achieving their goals: developing useful and usable services for the ones and understanding and enhancing their functioning for the others.

From an action-research point of view, the model of the figure 1 has shown its usefulness for building a framework for the project. PALETTE is under way and its actions will surely provide enhancements for the model by specifying the processes and the conditions of engagement, participation and learning within a CoP.

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