Creation, animation and perennial activities of Communities of Practice supported by ICT

Denis Brigitte

University of Liege,, Centre de Recherche sur l'Instrumentation, la Formation et l'Apprentissage 4000 Liège, Belgium

Abstract: The creation and the management of Community of Practice (CoP) supported by Information and Communication Technologies (ICT) can be an answer to the need of capitalizing and sharing knowledge for many private or public institutions. This paper describes the creation process and the development of six CoPs belonging to different fields (learning with ICT, education, and health). It aims at answering to two questions: "*Is it possible to create, animate and let a CoP supported by ICT become perennial?*" and *"Do ICT facilitate CoP's development?"* After presenting the main characteristics of a CoP and existing typologies, we describe the Web services used by the CoPs we followed during research projects. The collect of data was based on different methods: observations (e.g. concerning CoP members' participation to face-to-face activities and use of ICT services), questionnaires, learners' logbooks, interviews, users' productions analysis and shared documents. We examine the evolution of each community referring to their objectives and to the CoP's life cycle. We underline the obstacles and the facilitating factors to act as a CoP. Finally, we conclude, answering our two questions, and providing some recommendations about the management of CoPs supported by ICT.

Key words: Community of Practice, Information and Communication Technologies, Knowledge Management, Collaboration, Education

1. Introduction

During the last decades, the explosion of learning needs has been underline [1]. Lifelong learning is now a current concept that everybody agrees with. Everybody should learn not only for a mandatory period at school, but all along his/her life, when necessary (just in time) and anytime, everywhere. Our Western society's values extol the virtues of autonomy, creativity and collaboration. The necessity to create, capitalize and share knowledge is a challenge for many private or public institutions.

To develop knowledge management approach allows them to collect, from seniors and from other members of the team, experiences and practices in order to formalize and share them. So when somebody leaves, the expertise is not lost and the collected resources and experiences can be used to train newcomers. The concept of Community of Practice or CoP [2] seems to be an appropriate answer to this need of sharing, formalizing and interacting about some groups' practice. More: the use of technologies can support CoP's activities [3].

In our learning and knowledge society, it is postulated that every citizen should be acculturated to the use of Information and Communication

Corresponding author: Brigitte Denis has a PhD in Educational Sciences. She is Professor in educational technologies at the Faculty of Psychology and Educational Sciences at the University of Liège (Belgium). She is the Director of the Research Centre on Instrumentation, Training and Learning (http://www.crifa.ulg.ac.be/). Her research topics mainly deal with the design and evaluation of numerical learning environments including e-tutoring, self-directed and collaborative learning at a distance, communities of practice supported by ICT. She participated to and coordinated European and national projects in the field of Educational Technology.

Technologies (ICT). Efforts are made all around the world to train people to use computers for learning purposes [4] and in daily life so they become e-learners and e-citizens. But a digital gap still exists among people and the use of ICT is not so easy to master for some of them.

In this paper we shall consider groups of professionals (educationists, nurses…) or university learners. We will report on how these groups became or are becoming CoPs and on their use of ICT tools to support their activities of communication, production, classification and sharing of knowledge. Some of these tools are based on standards (norms from the W3C) and were developed and experimented during the PALETTE European project. The other kind of tool is the platform eGroupWare that integrates different Web services.

Our two main research questions are: "**Is it possible to create, animate and let a CoP supported by ICT become perennial?**" and "**Do ICT facilitate CoP's development?**"

First, we present the main characteristics of a CoP and existing typologies about CoPs. Secondly, we shortly describe the Web services used by several CoPs we followed during research projects. Thirdly, we present six CoPs coming from different fields (learning with ICT, education, and health). After describing the methodology used to collect the data, we examine the evolution of each group referring to their objectives and to the CoP's life cycle [5]. We underline the obstacles and the facilitating factors to act as a CoP. Finally, we conclude, answering our two questions, and providing some recommendations about the management of CoPs supported by ICT.

2. CoPs characteristics and typologies

The definition of the CoP concept and its characteristics varies with the authors and the contexts. For instance, although birth and animation of a CoP are generally spontaneous, an external

dedicated "animator" or coordinator can be part of a CoP to help it to start its activities.

2.1 Definition

According to Wenger [6] (p. 1), *"Communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavor (...) are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly."*. CoP members are linked together by a shared interest in a knowledge field. They want and need to share problems, experiences, models, tools and best practice. They deepen their knowledge continuously interacting either in a face-to-face or in a virtual mode. On the long range they develop good practice together. They build relationships and they develop their feeling to belong to the CoP and a mutual engagement. That creates a social learning environment. Sometimes, the CoP is created from an "external" initiative trying to solve problems or/and enhance learning and knowledge management.

The concept of "virtual community" emerged more than ten years ago. According to Henri [7], this concept refers to *"a virtual group that communicates via Internet, a structured social network driven by common goals that shares a cyberspace, a cyberspace with common areas where community life and interactions occur, cyberspace settlement involving community activities, artefacts, individual creations, common realizations, etc."*

Shared body of experience and knowledge and repertoire of resources constitute members' practice. For Henri [7], a *"shared practice is developed by the members of the community in order to increase day-to-day efficiency. It includes the history of the community; the knowledge it has developed, socially selected methods and common approaches to carry out the activities of a specific domain, common standards to direct actions, communication, problem-solving, performance and responsibilities"*.

2.2 Characteristics and conditions to become a community of practice

Let us recapitulate with Wenger [2] some characteristics or "conditions" that qualify a CoP.

- A CoP centres on a domain (shared interest in the domain).

- Each member has a minimal knowledge of the domain.

- Collective knowledge is bigger than individual member's one.

- Members commit to interact through discussions and activities, to help each other.

- Members create resources, tools, experiences, shared methods.

- They develop shared practice to increase collective knowledge.

This necessitates taking into account three essential elements: the mutual engagement, a joint enterprise and a shared repertoire.

2.3 Interactions and knowledge reification

These social interactions aim at sharing practices. According to Henri [7], the practice includes (1) a corpus of diverse types of empirical, theoretical, procedural, tacit and explicit knowledge; (2) reference frameworks, models, principles; tools; (3) experts, documents, lessons learned, exemplary practices, heuristics.

To share a practice, you need to reify it. That means formalizing it in order to let it accessible to others. This reification process is an opportunity to get a fix on practice and to create what Bonamy *et al.* [8] call "bridging tools" from a stage to another. Reification is also an important phase in the knowledge capitalization process. Extracting participants' tacit knowledge and making it explicit allows sharing it.

2.4 Degree of members' implication

The degree of implication of members of a CoP varies depending on the moment (e.g. actor's enrolment) and their objectives. Different roles can be endorsed by the members (see figure 1).
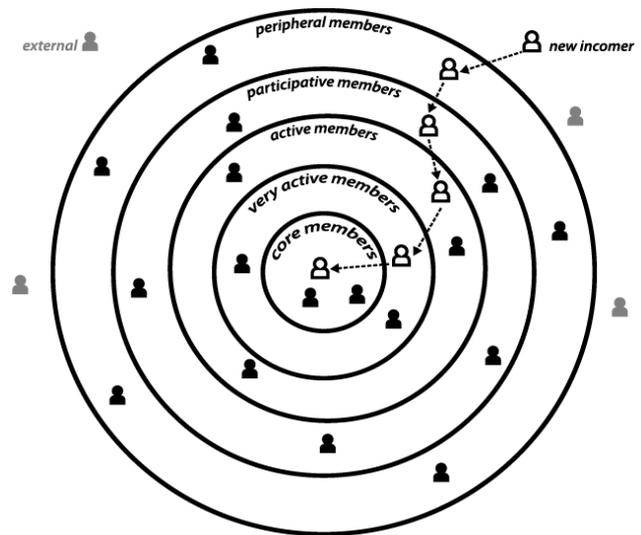

Fig 1. CoP's members' implication degree (inspired from Wenger)

We consider as "peripheral member" somebody who is part of the members' list, receives or consults messages and productions of (very) active members. A very active or "core member" is part of the core team and is a motor of the CoP; s/he can endorse different roles like coordinator and/or animator (e.g. forums moderation, stimulation of the interactions, contacts between members) and contributor (interactions, production and sharing of documents…). An "active member" participates to the interactions and contributes to the CoP's activities. A member can also be a "participative member", that means that s/he occasionally interacts with others or proposes a resource. There are also external people susceptible to enroll in the CoP.

2.5 Types of communities

Different authors distinguish several types of communities. Let us compare their points of view and synthetize them. All agree with the fact that communities differ from their intention.

Henri and Puddelko [9] point four types of communities. They are defined by two axes: on the vertical one the strength of the social link and on the horizontal one the intentionality and the consciousness of belonging to a community.
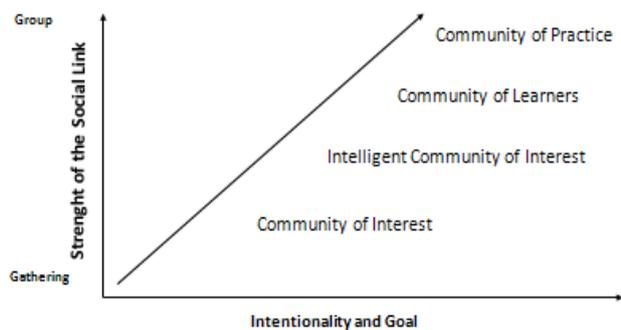

Fig.2 Different forms of virtual communities according to their emerging context

Henri [7] also distinguishes strategic from spontaneous communities. She points four types of strategic CoP:

1. help and assistance community
2. community of exemplary practices
3. community dedicated to knowledge management and knowledge stewarding
4. community of innovation

Parot *et al.* [10] (p. 30) point three big CoP's families:

1. *Cop themes/profession*. They are built on a mutualistic logic: "let us share together to be individually stronger".
2. *CoP innovation/improving*. They are based on a continuous bettering philosophy: "Let us collaborate together and better exploit our common resources to be collectively more efficient".
3. *CoP project*. The logic is based on the task force: "let us organize the collaborations and the sharing of resources to succeed in the project".

More precisely, Wenger *et al.* [3] (p. 70) identify nine orientations (activities and tools) towards the process of learning together in a CoP:

1. Meetings
2. Open-ended conversations
3. Projects
4. Contents
5. Access to expertise
6. Relationships
7. Individual participation
8. Community cultivation
9. Serving a context

A CoP generally combines different orientations. We shall further situate our CoPs relating to these typologies.

3. Technological services to support CoP's life

Implementing a CoP faces the issue of exchange and sharing modalities. Interactions and collaboration can be supported at a distance if access to adequate technological tools is possible [3]. Having at your disposal the necessary tools to attain the objectives and being trained to their use are two major assets for the virtual community life.

Several difficulties are linked to the choice of technological tools to support CoPs' activities. Denis *et al.* [11] underline the first difficulty is to provide adequate tools to CoP's members' activities. Utility, usability and interoperability are crucial factors that influence the services acceptability. Sometimes specific needs emerge and it is necessary to customize

the available tools to match with the concept of utility, usability and acceptability [12].

The following subsections present the services used by our several CoPs. The first set of services has been developed under the European PALETTE project. The second service, eGroupWare is an open source platform.

3.1 The PALETTE project tools and services

This European project named PALETTE (Pedagogically sustained Adaptive LEarning Through the exploitation of Tacit and Explicit knowledge) aimed at *"facilitating and augmenting individual and organisational learning in Communities of Practice (CoPs). Towards this aim, an interoperable and extensible set of innovative services as well as a set of specific scenarios of use have been designed, implemented and thoroughly validated in CoPs of diverse contexts."* (see http://palette.ercim.org/)

Its goals were to (1) express, represent and share practices and authentic problems, (2) debate and reflect about the practices and about the CoP's life, (3) develop, reify and exploit knowledge inside and outside of the CoP and (4) facilitate engagement, participation and learning.

A participatory design process was undertaken with developers, educational technologists and CoPs' members [13] to develop multimedia authoring, knowledge management and mediation tools. These ones are based on the respect of standards allowing data accessibility, reusability and interoperability [14]. So the use of technological tools to produce documents and to edit them in a collaborative way, to help collaborative learning and debates, classify and capitalise resources were instrumented[1].

We experimented five of these tools with four CoPs.

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[1] For a detailed description of these artefacts and of how they can support CoPs, see the Service Gallery space of the PALETTE project website (http://palette.ercim.org/component/option,com_servicegallery/ Itemid,120/).

1. **Amaya** is a Web editor. Browsing features are integrated with the editing and remote access features in a uniform environment. It also allows the design of templates that should favour the reusability of data.

2. **SweetWiki** (Semantic WEb Enabled Technology Wiki) is a wiki engine that has been developed around the semantic web technologies. It allows edition of Web pages and tagging.

3. **BayFac** is a service aiming at providing a mean to semi-automatically index (with the help of bayesian engine) and retrieve textual documents on the basis of facets regarding concepts relevant to a CoP.

4. **CoPe-it!** is a Web-based system attempting to assist and augment collaboration being held among members of CoPs by facilitating the creation, leveraging and utilization of the relevant knowledge. The system follows an argumentative reasoning approach, which complies with collaborative principles and practices.

5. **DocReuse** (Document Reuse) is a service enabling the semi-automatic reuse of structured documents.

A familiarization process with the use of the artefacts was undertaken each time a new one was introduced. It was based on different training strategies [1].

Three CoPs (Learn-Nett tutors, form@HETICE and TICFA learners - see hereafter) used these artefacts and provided feedback to enhance their design during trials.

3.2 The eGroupWare platform

After the international PALETTE project, another project called Health CoP started in Belgium. Since the first virtual CoPs we supported were not very familiar with ICT and not fully satisfied by the aforesaid tools - even if they offered interesting

functionalities, mainly because a lack of ergonomics [15], the researchers tried to find an "easy-to-use" and basic service which should match the listed CoPs' needs and ergonomic qualities. The first preoccupations were to choose tools of which the interface quality could be ameliorated taking into account, for instance, ergonomic criteria [16], Nielsen's heuristics [17], Shneidermann theories [18] or the ergonomic Web evaluation check-list from Nogier [19]. They finally chose the online collaboration platform eGroupWare (http://www.egroupware.org/). This open access service was customized to specific needs of our target public. For instance, a forum was added to the other existing functionalities (welcome page, personal pages, news, agenda, wiki, files manager (sharing space) ...). Different functionalities were also hidden since they were not useful at the moment.

This platform has also been used by ÉduCoP and two communities of the Health CoP project (nurses).

4. Presentation of the communities

Six communities are studied here (table 1). Four of them (TICFA-*Technologies de l'Information et de la Communication pour la Formation d'Adultes*, Learn-Nett – *Learning Network for Teachers and Trainers*, form@HETICE – *Formation dans les Hautes Ecoles aux Technologies de l'Information et de la Communication pour l'Éducation* and TFT/ICANE – *Transition Formation Travail / Infirmiers Chargés de l'Accueil des Nouveaux Entrants*) participated to the PALETTE project [15], two (TFT/ICANE and RHCS– *Référents Hospitaliers pour la Continuité des Soins*) are participating to the Health CoP one [11, 20] and the last one, ÉduCoP, to an exploratory research [21, 22].

Table 1   Characteristics of the communities

Name	TICFA	Learn-Nett	form@HETICE	TFT/ICANE	RHCS	ÉduCoP
Type	CoL	CoP	CoP	CoP	CoP	CoP
Domain	ICTE	ICTE	ICTE	Health	Health	Education
Starting date	2008	2000	2001	2007	2009	2010
Participation to PALETTE	Sept. 2008-Jan. 2009	June 2007-Jan. 2009	June 2007-Jan. 2009	Oct. 2007-Jan. 2009		
Participation to Health CoP				Jan. 2009 until now	Sept.2009 until now	

Some can be considered more as communities of learners (CoL) than as CoPs [9]. For some of them, if the profession of their members is "learner", their main goals are centered to master competences linked to contents (disciplines) and how to do this through authentic activities. They are probably less perennial than a CoP. They are often managed by members of the teaching staff. That was the case of TICFA where students followed a course during one year.

Nevertheless we have to notice that they also built and shared the history of the group, exchanged on other topics than those requested by the animator, so that the frontier between CoL and CoP is thin. If the common goal of the group is to share together to be individually stronger, they can be considered as a "thematic community of practice" built on a mutualistic logic [10]. The case of ÉduCoP is a little bit different. This community is also composed of

learners, but here, the activities are not suggested by teachers and the members can participate at least for three years if they enter the community early.

The others are communities of professionals (teachers of High Schools, nurses...), so they could constitute or evolve to become a CoP.

As we will see hereafter, the social links between members are or are becoming strong as well as the intentionality to share ideas and practice and the feeling to be part of a community. They enter the category of strategic communities, mainly dedicated to innovation/improving.

4.1 Communities in the ICTE domain

The **TICFA** CoL concerns nine members of the communities of learners involved in the course« Technologies de l'Information et de la Communication pour la Formation d'Adultes » (TICFA). Members are students of Master 1 in Education at the University of Liège (Belgium). They are going to be specialised in "Adults training". The courses are based on face-to-face and distance activities. A teacher and her assistant train and supervise these activities. They provide them some resources. They are also considered as the CoL animator**s**. The course deals with the use and the integration of ICTs in training and learning contexts. So it was a good opportunity to experiment the PALETTE tools and services, the hypothesis being that those ones can support learning, interactions, capitalization of knowledge… among CoPs members or even among a community of learners.

The **Learn-Nett** community gathers tutors in charge of the follow-up of groups of students involved in a collaborative distance learning activity: the design of educational scenarios integrating ICT. They are belonging to different universities from several European countries [23]. Every year a training session is organised to train the new tutors [24]. Afterwards these ones integrate the Learn-Nett CoP where they can share questions, resources, create different

documents, and reify their practice. For instance, they have virtual monthly meetings; the Learn-Nett guide addressed to the learners is adapted every year; the tutors write together papers about their experience, senior tutors participate to the juniors' training.

The **form@HETICE** community is composed of teachers of Higher Education from the Wallonia-Bruxelles Federation interested in the efficient use of ICT in their educational practices. Most of them are member of this network for several years (http://www.formahetice.ulg.ac.be/). They participate to plenary meetings, conferences and training seminars, they follow distance learning courses about ICT mastering. They propose news for the newsletter. Some react to the HETICE blog about concerns on ICTE. Thematic groups dealing with chosen topics (e.g. distance learning, master of native language, educational scenarios design…) gather some parts of the community members [25].

4.2 Communities in the health domain

TFT means "*Transition-Formation-Travail*". It refers to a community gathering on the one hand nurses in charge of welcoming newcomers or nurses students doing practical work in different departments of the hospitals, and on the other hand the nursing students' teachers. This community was created under the PALETTE "supervision". At the end of 2008, they counted 16 members. It evolves later and the members decided to rename the CoP "**ICANE**" *(Infirmières Chargées de l'Accueil des Nouveaux Entrants)*. There are now 115 members in the ICANE CoP. They are part of the Heath CoP project whose goal is to create, animate, make autonomous CoPs in the health domain, and to produce recommendations about those processes that could inspire such initiatives.

The **RHCS** CoP (*Référents Hospitaliers en Continuité des Soins*) is a more recent CoP that has also been initiated under the Health CoP project in 2009. A group of 65 people (nurses, social assistants…) belongs now to this community. The

members' functions are linked to the management of patients who are going to leave the hospital.

4.3 Community in the education domain

ÉduCoP potentially gathers all the students in educational sciences of the FAPSE-ULg (total number in 2011 =88). They are registered the Master preparatory year, the Master 1 or Master 2 in education. The initiative to build a CoP has been taken by a student of 2nd master who thought it could be a good opportunity for her colleagues to create and share resources and to communicate about their common questions. She became the animator and a core member of this community [22].

5. Data collection

Since the CoPs here described were also part of action-research projects, we systematically collected data to examine the way they manage and evolve (what were the members' activities, how they accept the provided ICT services, etc.). During the presentation of the CoP's life cycle of each one, we will use some results coming from the analyses of the data collected.

Table 2   Data collection methods

Projects	PALETTE			Health CoP		ÉduCoP
Communities *Methods*	TICFA	Learn-Nett	form@HETICE	TFT/ICANE	RHCS	ÉduCoP
Observations by the researcher (memos)	X			X	X	X
Questionnaires dedicated to the CoP's members	X	X	X	X	X	X
Logbooks (of the learners)	X					
Interviews of CoP's members	X	X	X	X	X	X
Production analysis (portfolios, documents, messages in the forums…)	X	X		X	X	X
Shared documents and references	X	X	X	X	X	X
Participation to face-to-face activities, variety of use of ICT services	X	X	X	X	X	X

6. CoP's evolution: life cycles and CoPs' members' roles

The CoP's life is running through five phases described by Wenger *et al.* [3] (fig.3).
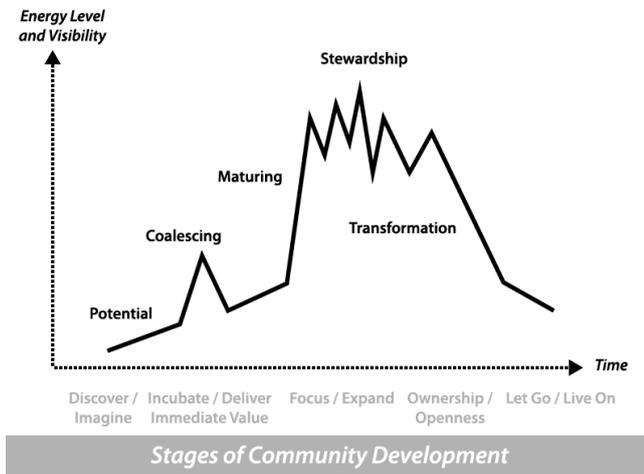

Figure 3: CoP's life cycle

Let us summarise the evolution of our CoPs referring to them and on the basis of different types of data collected.

6.1 Potential phase

If we compare **the origin and the structure of these communities**, we observe that in the contexts here addressed the initiative of gathering people is generally coming from people who are not especially linked to the domain/profession. So we cannot say that those communities emergence is really informal or spontaneous. Most of them have been deliberately created through the implementation of research and training projects because some researchers first made the hypothesis that there was a potential for the target group to benefit of a share practice sustained by ICT.

6.1.1 TICFA

The potential for creating and cultivating a CoL such as the TICFA one was identified by the **teachers** and referred to **academic work.** This initiative was undertaken through the **PALETTE project.**

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6.1.2 Learn-Nett & form@HETICE

A research group (technology developers and ICTE experts) from the European PALETTE project encountered existing communities or created some of them with the help of volunteers to participate to a participatory design process of tools and services whose aims were to sustain CoP's activities. Often a partner of the project (named the mediator) knew somebody or people of these potential or emerging communities. It was the case of the Learn-Nett and form@HETICE CoPs that were **initially coming projects initiated by university research teams** whose aim was to let Higher Education teachers and learners develop networking and collaborative learning with technological supports. Then, **the mediator's role was to facilitate** the communication between the different actors (PALETTE researcher/mediator, CoP's coordinator and its members) about the **adoption of new services** aiming at supporting the CoP's objectives.

6.1.3 TFT/ICANE & RHCS

The Health CoP project was submitted to the European Social Funds **by ICTE researchers from the CRIFA-ULg** who considered that different people face similar situations without having the benefit to share their practice. This project aims at the creation, animation, autonomy of CoPs in the health domain, and also at the production of recommendations about how this experience could inspire such initiatives. The selection of different categories of professionals was based on the observation that (1) new roles are defined, others are being developed and some professionals in charge with these roles are relatively isolated in the institution so that they have difficulties to exchange with their peers; (2) in specific domains, for several reasons, practices are hardly formalized, so that the expertise is lost when experienced workers leave and (3) as in many other domains ICT are unexploited or used in an unprofitable way because of a lack of training in this

domain. The potential of such communities was explored **through a need analysis** (meetings and interviews) that confirmed or not their interest to engage in the coalescing phase. Different **strategies** were developed **to gather the potential members**: contact all professionals of the different hospitals concerned by the specific isolated roles (e.g. ICANE) or contact some of these professionals, gather them during a first meeting and enlarge the group afterwards (e.g. RHCS) (Bomgart *et al.*, 2011).

6.1.4 ÉduCoP

ÉduCoP originates from an **exploratory study that was undertaken as a master** thesis **by a student** of 2nd Master in Education convinced of the importance and the need of gathering her colleagues in a community of practice (Bomgart, 2011). To validate her point of view, she first collected through a questionnaire the students' needs and their interests and motivations to enroll in such a project. After checking the motivation of the potential members to enroll in such a community and the tasks they would like to carry on, she identified with her mentor the most suitable technological tools to support this goal. The platform eGroupWare integrating several services (agenda, participants' profiles, documents storing, announcements, etc.) was chosen. She became the CoP's coordinator and animator, her roles mainly being to stimulate or regulate the exchanges between members (if necessary).

These cases show that the creation of a community of practice through external initiatives and supported by ICT is possible.

6.2 Coalescing

Whatever the origin and the process of the CoP's creation, it is important that the members **align their interests**, build their identity and the feeling to belong to their CoP. So **convergence actions**, recognition of the potential of the CoP, share of practice… have to be enhanced. The animator(s)'s roles are to "cultivate

the community" [6], to coordinate it, and to catalyse its development. For instance, our CoPs animators suggested convergence actions such as to create the logo of the CoP (e.g. TFT/ICANE, ÉduCoP- see figure 4), or to choose its name (e.g. ÉduCoP).

Figure 4: TFT and ÉduCoP (collaboration tree) logos

Other activities were also organised, for instance a **speed dating** to present each other (first in pair and after to the group). Brainstorming took place to define potential topics to be explored, practice to be shared and how to do that with the support of new ICT services. The animators organised **training sessions** to let the users handle the PALETTE services or the eGroupWare platform. In all the CoPs, the members decided to meet and interact also in face-to-face and not only through virtual spaces.

Afterwards CoPs members started to carry some **activities, spontaneously or suggested by the animator**. In addition, this latter followed them up in order to answer their questions (technical and others) and overcome the difficulties encountered by their members.

The CoP animation can be ICT supported and managed by a coordinator who is not a professional of the CoP domain. Face-to-face meetings help the identity building, debate and master of ICT services (training sessions).

6.3 Maturing

The members engaged in **developing a practice**. In the CoPs, topics were **chosen by the members with the help of the animator**. For each community of

learners, different scenarios or tasks were proposed by the animator/teacher. In both cases, through the use of the tools described above, the goals were to develop and sustain

- ICT tools appropriation
- identity building
- reification and reflexivity
- share of resources and their classification
- communication and debate

6.3.1 The TICFA CoL

During the PALETTE project, the members of this CoL used the tools (described above in section "technological services") to carry out the following **activities**. These trials are described in detail in Denis & Fontaine [26].

- Analysis and comparison of learning environments through two educational models (Amaya – DocReuse).
- Edition of news about the ICT in Education (ICTE) to be shared by the CoP's members: the "WikiNews"(SweetWiki)
- Keep a logbook / portfolio (Amaya)
- Edition of collective documents on a particular topic (e.g. "netiquettes", learning organisational resources...) (SweetWiki)
- Tagging of webpages (start the creation of the CoP's folksonomy) (BayFac)
- Searching for resources through facets and their values (in a dedicated space where documents had be faceted) (BayFac)
- Debate on the feeling of belonging to a CoP (CoPe_it)!

The evolution of the members' representations and practices was observed through answers to a questionnaire (before and after the activities), the individual logbooks weekly handled by the participants, interviews and their productions. We observed that the use of several tools or services allowed the members to become more competent in the domain of the ICT in terms of practices and technological literacy. They discovered more transverse software functions through the tools used and felt more comfortable when using new interfaces. This also decreased fears in some members who had negative representations regarding ICT.

The proposed scenarios concretely offered to the CoL/CoPs' members to live collaborative activities supported by ICT services. They could exchange ideas, resources and knowledge. These experiments enabled them to refine their representations about collaborative learning and to get reference tools to support their future activities. They declared that the **use of these artefacts allowed the emergence of a CoP** but also the development of the **feeling of belonging to a CoP**. After four months of regular activities, their feeling to belong to a CoP was strong. They qualified themselves as the TICFA CoP and designed a mouse pad for their group and offered one to their animators (fig. 5).

Figure 5: "Feeling to belong to the TICFA CoP

The tasks realization during the PALETTE trials created some common interests between the members. For many of them it was their first experiment in **collaborative edition**. They learned favourable modes and codes to produce and exchange when carrying on this kind of task. They also perceived the **importance of the role of a CoP animator**.

As for the production of documents, the discovery of several new tools allowed the CoL/CoP's members to compare them with different editors they already knew and to examine their advantages and disadvantages. Even if the tools were not still or sufficiently accepted and adopted by the members, this comparison allowed a certain awareness of the **importance of standards, exchangeable documents and durability of data**.

6.3.2 The Learn-Nett CoP

The goals were to reify the tutors' knowledge and practice, to classify and to archive resources on the basis of the CoP's ontology. Different scenarios to use the PALETTE services were proposed. For instance, the animator designed a common structure in the semantic Wiki for the description of problematic situations and their solutions. Examples (from previous years) used during the tutors' training session were proposed online. Afterwards, once such a situation appeared, a tutor described it into a Wiki page and proposed his/her solution and tagged the page. Other tutors could then comment the proposed solution or propose new solutions. The tagging system offered the possibility to search for related situations and solutions. Even if this scenario was chosen by the CoP mediator and the two tutors' trainers, this had not the expected success [27] in particular because of weaknesses in the usability of the SweetWiki editor. Another activity was the collaborative writing concerning a chart about the roles and duties of the Learn-Nett community members (coordinator, tutors, etc.). Such a precise task had more success maybe because there was a (short) deadline to carry and finish it.

Another reification activity was the gathering in one space of the documents produced in Learn-Nett since its beginning in 1997 (e.g. students' groups reports, students' individual reflective reports, Learn-Nett pedagogical or technical guides, research papers of any type, presentations in conferences, tutors' or students logbooks, external resources used by tutors or students, etc.). Then the BayFac service was used on the basis of the Learn-Nett ontology created by two representative members of the CoP with the help of the PALETTE mediator. The Learn-Nett members had then the opportunity to upload documents into the Web space and classified them. Finally, all members of Learn-Nett (students, tutors, professors, coordinators, etc.) could access the resources, but they did not use a lot BayFac. This was mainly due to the short number of documents archived online during the trial phase, and to the restrictive method for classifying new documents. A collective training and a better ergonomics would help the appropriation of these services. It also takes time to change habits.

After the PALETTE project, this CoP continued to exist and to use general ICT tools, but no longer those proposed by this project. They use videoconferencing service (Centra) during the tutors training session to communicate and to share documents or during the final presentation of the learners' works. The tutors use the Galanet platform to manage most of their interactions with the learners. The profile of each Learn-Nett member is available on this platform. The capitalization of previous students' work is only made by archiving the session of the year. Then the reification of knowledge is mainly done through the publication of research papers, participation to conferences such as through the improvement and the sharing of the learners' guide.

6.3.3 The form@HETICE CoP

In 2007, Milstein and Denis [25] used a questionnaire about the following dimensions: mutual engagement, common enterprise, shared repertoire, learning and group dynamic, and identified different

thematic groups as (potential) communities of practice inside the larger form@HETICE network.

In 2007, some members were convinced of the potentiality of the PALETTE services to capitalise and share knowledge, so they built with the help of a mediator the ontology of the CoP [28] who let it validate by other members and began to classify the form@HETICE resources. Around three hundred were selected and uploaded on the BayFac service. The use of facets permitted to classify and retrieved them. This system replaced the archives and was available via the form@HETICE website. It had not a great success among the community but the resources were present when needed. Finally, the BayFac was not available any more in 2011. The team decided then to give online access to the resources from its website. **The work done before was reinvested and updated**. Internal resources have now migrated and are classified with the help of the Diigo service. Some specific resources are also available from a web page of the form@HETICE website, taking into account the category of activity (conferences, plenary meetings and training sessions). There is also a platform (Netvibes) devoted to the topics that can interest the CoP. So a step was taken by the team to adopt such kinds of services. It takes time to appropriate them and to give sense to this kind of practice. That is why activities like meetings, edition of the newsHETICE… can sustain the development and sharing of new practice. That is always the members who decide whether they will adopt or not what they discover. One more time, the usability of different tools (e.g. Amaya) or services (e.g. SweetWiki) were not estimated sufficient to motivate them to use them regularly even if they were innovative and promising.

Some topics of interested remain, other evolve. For instance, the CoP members are still interested in the exploitation of e-learning platforms, in legal and ethics problems related to that, in the creation of scenarios integrating ICT… That is why the form@HETICE team does not only propose meetings

or resources but has decided to **reactivate thematic groups** where members can reify and share ideas at a distance and in face-to-face.

6.3.4 The ICANE & RHCS CoPs

From 16 in 2008, the ICANE CoP counts now 115 members coming from 66 hospitals. There are core members (very active), active, participative and also peripheral ones. But these **CoP members are more and more active and developed the feeling to belong to a CoP** [20]. In 2010 they decided to create **two local cells** depending on geographical repartition and specific topics to deal with. **Results are shared** with the others via the ICANE **eGroupWare platform**. The whole group is also invited to meet around three times a year. Contrarily to the beginning, meetings are organized in the different institutions and rarely at the University. The agenda is decided collaboratively. An average of 25 participants is observed for these face-to-face meetings. It is the opportunity to have presentations by and discuss with an expert, topics and invitations being decided by the group. New members regularly join the CoP, generally introduced by pairs. These new **incomers are trained to use the ICT tools** either by the animator or by members.

The older the CoP, the more their members share documents, interact in the forums. Currently, rare are those who use spontaneously the wiki. Connections to the eGroupWare platform are higher just before and after the face-to-face meetings.

In the questionnaire and during the interviews, both ICANE and RHCS members declared they joined their respective CoP because they wanted to better know and understand their functions and promote it. Some of them felt isolated. Most of them declared they feel satisfied by the richness of the exchanges, by the share of resources and by the end of isolation. The main obstacles identified are a lack of mastering of technologies and problems of connection in their institutions. But they say they are convinced of the necessity to use them in the future. **Roles evolved**. For

instance, a small team is voluntary to restructure the documents in the file manager. The roles of the initial animator (CRIFA researcher) is switching when the CoP becomes more autonomous: at different degrees she is a manager, a counselor and a helper (e.g. when a member loses his/her ID or password or needs training or a hot line to use the platform, to remind the members of the agenda, to contact or invite an expert…).

6.3.5 Éducop

The **commitment of the members** is progressive. Some become "active" (interact, produce and share) and do not limit themselves to a peripheral role (consult what has been produced by the others). Denis and Bomgart [22] observed the members' implication evolution after a time (connections, share of documents, interactions in the forum, etc.) Thirty members were interviewed so that we obtained information related to the difficulties the members encounter to collaborate and to capitalize knowledge. In addition we obtained information on the nature of participation (implication) of each of the interviewees. Generally the most active people were girls, especially those in the last year (2nd master). This observation is amazing since the students who can benefit the most important added-value are the members who start their program. All the members interviewed said there was an added-value from ÉduCoP. Two thirds of the "passive" members declared they will be more active next year and that they will not limit their participation to consultation of resources, but also to production and sharing.

Permanence of CoPs implies the enrolment of new members and their commitment. Different members should also play or share the role of animator, but it seemed to be too early during the first year of the CoP creation.

There is a diversity of activities in the CoP that are decided by the members. Roles evolve and the external coordinator/animator one is reduced. The appropriation of ICT tools depends on the perceived

utility and their ergonomics. Blended community (interaction in face-to-face and at a distance) seems to be a good compromise to develop and maintain the members implication in a CoP.

The practice reification is possible but takes time and is depending on the direct usefulness to the members. It is easier in CoL since the activities often impose a production.

6.4 Stewardship

Except the TICFA CoL, these CoPs are at this stage: they have to **maintain the relevance of the domain, institutionalize the voice of the community** and **recruit new members**.

The **TICFA** members continued to collaborate the year after having followed this course. They transferred the use of ICT services in different other learning contexts.

The **Learn-Nett** tutors' CoP integrate new members at the end of each year. They participate to a tutors' training session to share a common view on the Learn-Nett environment and their roles into it. Afterwards, core members will support them and help them to access to the memory of the CoP.

The **TFT/ICANE** CoP is quasi autonomous. New incomers are registered and progressively participate to the CoP activities. They are now 115. They still use their eGroupWare space to capitalize their reflections and productions, interact in forums and meet in face-to-face.

The **RHCS CoP** is evolving in the same way: increase of members, use of ICT tools, meetings organization and work on different topics.

In **ÉduCoP**, new members are coming from a new students' cohort. Some ancient members share works done and evaluated during the last academic year. Among the students, there are now some active members helping the initial animator /coordinator. Because of its institutional anchoring, they had to migrate to the institutional platform eCampus. The

transfer of resources is done by the animator as well as the members' training to the use of this tool.

> Once the CoP building process is started and the utility to participate and use ICT services is perceived, the communities can evolve and become perennial. We always have to keep in mind the utility, usability and acceptability of ICT tools by CoP members.

6.5 Transformation

The **TICFA** CoL members left the university. We do not know whether they continue to communicate together, but we are convinced that they will not forget what they lived and learned during the TICFA course activities.

There is a **turnover** among the **Learn-Nett** and **form@TICEF** members, but these CoPs still have good reasons to exist.

The **TFT/ICANE** and **RHCS** members are enthusiastic and become more invested. There is some autonomy in the CoP management. These CoPs could be perennial unless they decide it is no more relevant for them since they have no more practice to share.

Some **ÉduCoP** members who left the university keep contact through the platform but seem to be more interested by jobs proposals than frequent interactions with newcomers. They also created and are exchanging in a FaceBook group. Their interests differ now so they are starting to hold a new community.

> Some of those blended communities will transform and continue to adopt the same or different ICT services to communicate and share. Some will die or invest in other topics or different communities.

7. Conclusions and recommendations

Our two main questions were: "Is it possible to create, animate and let a CoP supported by ICT become perennial?" and "Do ICT facilitate CoP's development?".

We observed the development of six communities whose members used ICT services. They were first created and cultivated by an external coordinator/animator. These CoPs belong mainly to the category *innovation/improving* [10].

They combine most of the orientations and some ICT services mentioned by Wenger et al [3]: face-to-face blended meetings, synchronous or not, projects leading to reports about a practice, sharing of contents, access to internal or external expertise, relationships, participation styles, community cultivation by an external facilitator and engagement in a mission serving a context.

All of them are blended communities: members meet and interact in face-to-face and at a distance. The relationships between members have become stronger. Sub-groups have been constituted when the community became larger, but their members always report and share their work with the whole group. All CoPs benefit of access to internal or external expertise. The feeling to belong to a CoP is present and increases among members.

They actually produce documents individually and collaboratively. The CoPs involved in the PALETTE project classified or retrieved some of them using facets or tags. Within the proposed scenarios they usually used the artefacts in the way prescribed by the developers. But they gave up after the project, using other available services and not those under development even if there were promising.

The members' roles have evolved. The coordination and animation is progressively taken in charge by core or very active members instead of the external coordinator (researcher who created the CoP). Alignment of interests, convergence actions, training in the use of the ICT tools, matching of ICT with activities needs, good ergonomics, availability of online profiles, animator's support, blended participation… are good ingredients to let a CoP become perennial and to facilitate its development.

The CoPs' members have built their identity and shared common interests, resources and strategies to reach their objectives. They are convinced that ICT

can support their activities but the services used have then to be usable and customizable to members' needs. These ones are sometimes not familiar with technologies. Training them is also recommended to increase acceptability, appropriation and the use of technologies to carry out their tasks.

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