

11 Communities' Development in CVEs and Sustaining Functions of On-line Tutorship

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Abstract. The impact of Collaborative Virtual Environments (CVEs) on communities' development is a topic still rather unexplored. All the interaction processes mediated by these technological environments are characterised, from both psychosocial and discursive points of view, by absolutely new practices and by the absence of some communication features, typical of face-to face. The "Community of Practice" model, allows us to analyse the growth of virtual communities along the construction of a *shared repertoire*, the involvement in a *common enterprise* and the sharing of a *mutual engagement*. Communities of practice use technology in social and material contexts, sharing meanings about the technology uses and peculiarities through a continuous negotiating process. The analysis is aimed at describing how a community of practice is established in a virtual world where both textual and graphical interactions are allowed. Conversational and quantitative results show: a) how the community of practice evolves over the time, b) the specificity of the interactions mediated by the virtual environment; c) the role of different participants in the management of discourse in interaction, with a detailed analysis of the on-line tutorship impact on the development of the community.

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11.1 Technology and communities

Technological innovation makes problems that were central no long ago in the ergonomics of human-computer interaction rapidly obsolete. Information and Communication technology and virtual reality environments underline the theoretical and empirical limits of a purely cognitive ergonomic perspective, focussed on interaction between user and technological system. The adoption of new theoretical and empirical approaches able to analyse the social complexity of technology mediated communication and interaction processes is nowadays required. The main characteristic of telematic and virtual technology is that of sustaining and mediating our interaction and communication with others: they mediate a complex person-computer-person-computer-person system.

From these considerations a perspective, defined as social and cultural ergonomics, has been developed [1, 2, 3, 4]. Cultural perspective considers as central units of analysis the social contexts of interaction and communication mediated by technological systems, observing carefully how different technological systems are developing new communicative and interactive contexts. “Each online communication system structures interaction in a particular way, in some cases with dramatic effect on the types of social organizations that emerge from people using them” [5, pag.4].

From this point of view, technological artefacts are not only neutral tools able to develop tasks already defined: on the contrary, they prescribe determinate working and communicative practices sustaining specific social actions [6, 7]. Technology should not be analysed as simply technical and material tools but as cultural artefacts mediating the social, distributed and situated construction of communicative and interactive practices [8, 9]. The central concept to understand the result of interaction among shared practices and technology is that of “mediation” [10, 11, 12]. Communicative and interactive practices are always developed in *inter-subjectivity* and *inter-objectivity* contexts: in social contexts (with others members) and through the mediation of artefacts, nearly exclusively technological, sustaining the communication processes and the information sharing and coordination.

Speaking of mediated practices, it should be underlined that communicative practices cannot have a meaning outside a repertoire shared within a community. An electronic mail system, a text chat or a Collaborative Virtual Environment (CVE) will never be used in equal ways in different communities of practice: they will assume specific meanings and they will sustain peculiar social communicative practices through the mediation of the pre-existing practices system [13].

The Community of Practice model [14, 15, 16] allows us to focus on communities where the participants co-construct a *shared repertoire*, are engaged in a *joint enterprise*, and are involved in *mutual engagement*. In previous studies we showed how the communities of practice at work use discourse in interaction for negotiating social identity of self and others [17] and for sharing some dimensions related to the development of work projects as for example time boundaries [18].

The use of “community of practice” as central unit of analysis of cultural ergonomic research leads to consider human action as always built by answering to other persons, in social contexts of inter-subjectivity. In fact it is only the interaction among individuals that makes possible “the existence of a “discourse world”, defined as repertoire of social and shared meanings [19]. Human action, even when mediated by technological artefacts, is always a social action: an action whose meaning is interactively and discursively built in the course of the social practices that we share with other individuals [20, 21]. Such actions are implemented through discursive interaction and during the course of shared practices. Both processes are culturally elaborated [22] and constitute the meaningful actions repertoire of a specific community of practice that should be

known in order to understand (and anticipate) how the technology would be used in that community [23].

Communities of practice use technology in their social and material context, attributing to them shared meanings that are developed and defined through the continuous negotiation of their possible uses (and not-uses), benefits, disadvantages and peculiarity.

This negotiation process explains how the use of each technology is shaped and developed by different communities of practice. Pre-existing shared practices act as essential mediators among the intended (by technical developers) meaning of technology and their actual use in the daily practices of each specific community.

The focus of an ergonomic analysis becomes then the negotiation and development of such shared meanings through the interaction with others among specific communities of practice. The main aim is to describe how, through a negotiation process, a repertoire of shared practices is built. This is essential to understand how the community uses the technological artefacts [24]. The shared repertoire of practices in a community - even when technologically mediated - is not the starting, but rather the arrival point of a common activity. A community is incessantly engaged in the negotiating activity about meanings in order to build and widen the shared repertoire (even tacit) and to adapt it to the contingent needs of the community itself. In this way the community can be efficient and collaborative and can ground the basis for further negotiations.

All the interactive processes mediated by technological environments are characterised by the presence of absolutely new practices from the psychosocial and discursive points of view, and by the absence of some communicational practices typical in face-to face settings. It is also essential to distinguish among different mediating technological systems: the multiplicity of technological systems forces us to distinguish more deeply among different types of virtual communities. Recent studies [25] show the relationship between the distinctive characteristics of different mediating systems, in terms of communication channels and resources offered to the interacting participants, and the task performed. Some authors [26, 5] propose some classifications of the different mediating environments sustaining the development of community of practice based on the synchronicity and on communication channel available:

- a) E-mail and discussion list: asynchronous communication, only textual;
- b) Usenet and BBS: asynchronous communication, only textual;
- c) Text chat, internet relay chat MUD's: synchronous communication, text based;
- d) Metaworlds (3D MUDs, 3D Collaborative Virtual Environments): synchronous communication, textual, sharing of a "graphical space", realistic identity (avatar);
- e) Interactive video and voice (synchronous communication, verbal and not verbal communication sharing of a real interactive space, real identity).

These mediating environments are greatly differentiated in the temporal aspects of communication (asynchronous or synchronous), in the textual constraints of exchanges, in the presence of a virtual space in which to represent social encounters and in the presence of real voice and identity.

Each of these aspects would pose some specific constraints (both positive and negative) on the style of interaction as well as on community development. Every time the characteristics of the interaction within a community working inside different technologically mediated environments should be identified and described. Nowadays, the specialist literature is still focussed on "describing and analysing patterns of online social interaction and organization as they exist" [5, pag.4] in the virtual environments created by each technological system, without any evaluative and comparative aims. Researches about the potentiality, constraints and limits of technology for mediation of collaborative interaction and coordination of the groups would be advisable.

Besides the limited effort on comparing different technological environments, when speaking of virtual communities another theme is even less present in the literature: differences in the story,

structure and aims of each community. Most of the literature presents data on “free” communities, not stable (members can join and leave at any moment), based on poorly defined aims and with no shared objectives [5]. Even if these virtual communities have very interesting aspects for a social and psychological analysis, it is of remarkable interest to analyse the development of interactive patterns inside stable and definite community, such as work communities [13] and communities formed around a specific project [27]. Those communities are characterized by a stable composition, assigned communicative and organizational roles, members identities declared and strategically used to accomplish the task and a common effort to achieve shared aims.

These features make those communities privileged loci for the analysis of the technology mediation on the negotiation of the fundamental dimensions of a community of practice: mutual engagement, joint enterprise and shared repertoire. This is the case of the Metaworlds virtual community based on a 3D Collaborative Virtual Environment that is analysed in this paper.

11.2 The Euroland project

Euroland is a research project involving students, teachers, and researchers from two European countries (Italy and The Netherlands). The main research goal was to design and implement an educational virtual reality environment fostering collaborative learning at a distance and enabling students from schools apart to work together, collaborate, and communicate. The principles used in designing the projects were inspired by the community of learners [28] and practice [14], where knowledge is built through computer supported collaborative learning [29]. All participants — students, teachers and researchers — collaborate actively on the design, building and evaluation of Euroland exchanging information and ideas with the partners at a distance. During the project, that lasted eight months, three weekly meetings were scheduled in order to let at least two groups of participants located at a distance meet synchronously. Several cultural houses populated Euroland: the house of music, art, sport, food and a travel agency. The collaborative construction was guaranteed by the “interdependence” principle [30] according to which each participant had to take charge of the cultural content of the partner country.

The software used for this project is a CVE named Active Worlds (AW) (www.activeworlds.com). AW is a three-dimensional, desktop, non-immersive virtual reality software, very user oriented. It is based on collaborative and constructive learning principals. In fact, it allows participants to design and build virtual objects and any type of web-based tools can be embedded into the virtual environment created by AW. There are two different types of “universes” AW based: one of them is entertainment oriented, the other (called Eduverse) has an educational vocation and it is composed only by virtual worlds monitored by research centres, schools, and universities. Euroland is part of this universe, which sustains a broader community with a common interest about the educational value of this type of technology and protects the virtual worlds from unwanted visitors. In fact, only people registered within Eduverse can visit the virtual worlds and several cross-virtual worlds exchanges and activities were planned during the project.

11.3 The social actors

Seven schools, four from Italy and three from The Netherlands, participated to the project.

The youngest students participating were 9 years old and the oldest 14. In each participating classroom a small group of students (from 2 up to 10) were selected and enabled to connect to the virtual worlds as citizenships with building rights. For each group of citizens, at least one

teacher was actively involved on-line and often other teachers supported the in-classroom activities related to the project.

The staff was composed by seven researchers. Four of them acted as on-line or in classroom observers and three of them acted as tutors on-line. One of the tutors (Bea) was also the project manager. She is a researcher with a strong background in educational psychology and about mediated communication in educational contexts. Clarence is the tutor expert in using the software AW and he has a particular talent in teaching building strategies to kids on-line. Lp (short name for Little Prince) was in charge of the start up of the project and later he was mainly dedicated to the server control and monitoring.

Table 11.1 Differences in participation

Type of participants	n. of participants	n. of interventions	Ratio int./participants
tutors	3	16821	5607,00
researchers	4	2407	601,75
teachers	13	3323	255,62
students	40	6490	162,25
occasional guests	27	331	12,26
Total	87	29372	337,61

Euroland was also populated by occasional guests coming from the other virtual worlds belonging to Eduverse, by kids' parents connecting from home, by citizens' classmates and friends curious to see what Euroland was about.

The three tutors, among which there was also the project manager, participated with a great amount of interventions. The others participants seem to participate quantitatively in accordance with their responsibility and engagement in the organisation of the project: the collective impact of researchers and teachers on the total amount of chat talk is greater than students' impact. This result is due to the fact that the Euroland project has been conceived as a pilot project and all the adults, according to their roles, spent a lot of time in discussing its development.

11.4 The objectives

The main aim of this study is to show how both formal and informal aspects of the communication and participation to the community are longitudinally defined by the members through discourse in interaction, using the tools available within the virtual environment the group is building. We will focus in particular on:

1. How the dimensions of a community of practice (mutual engagement, shared repertoire, joint enterprise) develop and are negotiated within a stable and educational community, such as Euroland;
2. How the specificity of the virtual environment mediates the participants' interactions. Special attention will be given to some phenomena related to the explicit use of technical features and software related characteristics as interactive resources, and
3. The role covered by the different participants in managing the discourse in interaction. Since the most active participants were the tutors on-line, a closer look will be given to the tutors' impact on the development of the community.

11.5 Looking at virtual communities as natural groups: ethnomethodology of the virtual meetings.

Ethnomethodology and conversation analysis, integrated by the recent methodological research about on-line interactions, and especially the studies on discursive interactions in CMC environments, are more and more considered as the appropriate methods to analyse data collected in research like the one presented in this paper. In using these methods will be taken in consideration that Internet “provides a level of access to the details of social life and a durability of the traces of social interaction that is unprecedented” [5, pag. 4].

From a methodological point of view, this implies the analysis of the negotiation of shared meaning in the discursive interaction within members of a “natural community”. The ethnographic and discursive perspective [20, 22] is able to grasp the social complexity of the negotiation practices, considering as unit of analysis the activity system of the community of practice (instead of single individuals). Conversation analysis [31] looks for order and regularity in human actions, in the place of they observable intersection, that is in the forms that persons give at their encounters with others, in the empirical methods with which they regulates the shared activity and with which attribute meaning to artefacts, even technological, with which they go into contact. The corpus of data comprises all the chat interactions over a period of eight months, 29372 total turns collected in eight months (about 80 chatting hours).

11.5.1 *The analysis of the development of the Virtual Community*

The first part of the study is aimed at describing how Euroland participants became a community of practice. Based on Wenger’s theory [14] we started analysing the chats by identifying the topics¹ of discussion according to the three fundamental dimensions: a) mutual engagement, b) shared repertoire, c) common enterprise.

Topics belonging to these dimensions were isolated within the chats. Each turn inside the identified topic has been codified according with the related dimension. Once discarded turns in Dutch (none of the researchers knew that language), digressions and not comprehensible utterances, 28802 turns have been codified in total. A qualitative research has also been carried out in order to show the interactive processes that lead to the development of each dimension in the lifetime of the community.

11.5.2 *The analysis of tutors’ impact.*

As said before, the Euroland community emerged around specific educational aims. The project was built defining different roles for each participants according with two integrated aims: a) a research aim, that is verifying whether 3-D software can be used for educational purposes, and b) a didactical aim, that is trying to enhance learning of specific topics through collaboration among distant classrooms. Teachers’ and researchers’ aims shared even if they were not always overlapping. This particular condition is interesting to see how the researchers leading the community as a whole offered their tutorship over the time and sustained the development of the community.

Starting from the work proposed by Shathon et al. we developed a category system for the tutors’ functions. All the tutors’ interventions in chat were analysed through that category system.

¹ We use the term *topic* according to the definition of Conversation Analysis, as a sequence of at least three turns on the same argument developed by at least two participants.

Three independent researchers checked the interventions' categorisation. The uncertain cases were discussed till an agreement has been reached. The category system of tutorship comprises four different functions, each of them composed by sub-functions, presented in details in Ligorio, Talamo and Simons [33].

The main tutoring functions are:

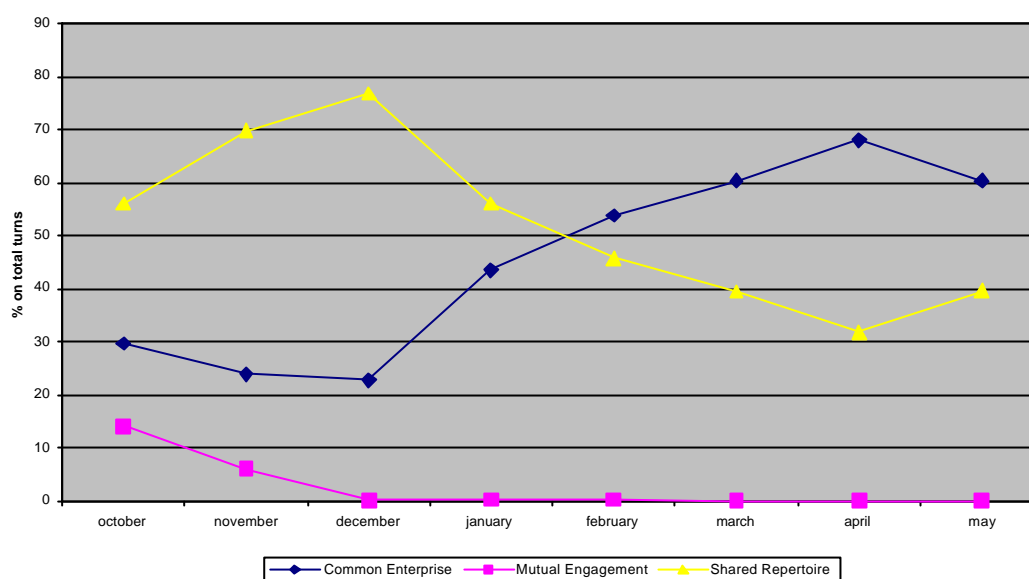
1. **MANAGERIAL**: all the attempts to coordinate the activities and to keep the project coherent to its general aims.
2. **SOCIAL**: interventions aimed at supporting social and interpersonal relationships between community members through the consideration of personal expression, needs, requests, and feelings.
3. **TECHNICAL**: all the interventions related to specific technical problems (computer connections, server availability, etc...)
4. **PEDAGOGICAL**: explicitly aimed at sustaining the learning process about the specific didactical contents as well as the building strategies of the virtual objects with whom Euroland has been built.

11.6 First outcomes: How did the Euroland community develop in the CVE?

Graph 11.1 gives an overview, as it emerges from the chats analysis, of the longitudinal development of the three fundamental dimensions of the Euroland as a community of practice. Graph 11.1 shows that each of the three dimensions follows different evolution paths over the time.

a) Mutual Engagement. The Reciprocal Engagement is the only dimension whose trend is based on a very low percentage of interventions during the whole project. The starting level (around 15% of total interactions) quickly decreases after two months. These data suggest that the mutual engagement is a dimension that is negotiated at the very beginning of the project, in order to verify that all the participants have satisfactory conditions to carry the collaborative work. The low level of interaction dedicated to mutual engagement can be explained by considering the nature of the community itself. As already said, the Euroland project raises from common interests of both researchers and teachers to test and implement the three-dimensional environments in a didactical way. This interest was negotiated before the chats on-line started, through personal contacts between researchers and teachers that took place during face-to-face meetings, phone calls and e-mail exchanges, as found in previous ethnographic survey [34]. The mutual engagement was negotiated outside the virtual environment. The students' engagement is negotiated within the classrooms, among teachers and students, built mainly during the pedagogical relationship that each teacher developed inside her/his classroom.

The development of the Community



Graph 11.1 The development of the community's dimensions along the project

During the recruitments phase, even when teachers and/or principles declared their availability to participate to the project, the project manager always assessed and stated the conditions for a mutual engagement. In the chat excerpt below, recorded during a very initial state of the project when participants were still wanted, one of the tutors (LP) organized an on-line meeting between the project manager and a few new candidates:

Excerpt n. 1 (October 13, 1999)²

11. *LittlePrince: Bea listen to me.. .*
12. *LittlePrince: I am right now at a meeting with school principals ...*
13. *LittlePrince: there are some interested ...*
14. *LittlePrince: is it still possible for new schools to participate to the project?*
15. *Bea: yeeeeees... to whom are you thinking of?*
16. *LittlePrince: There is a art school and a few junior schools ...*
17. *LittlePrince: the art school is interested in particular in organizing an art exhibition in The Netherlands...*
18. *Bea: and this a school is right now there?*
19. *LittlePrince: paintings, sculpture, and architecture exhibition...*
20. *LittlePrince: what do you think about it?*
21. *Bea: It seems a great idea!*
22. *LittlePrince: can I eventually collect new participants?*
23. *Bea: Sure, but under certain conditions*
24. *LittlePrince: what conditions?*
25. *Bea: 1) they have to fill a questionnaire, both students and teachers*
26. *LittlePrince: ok.*
27. *Bea: 2) they give to me their weekly agenda with when they can connect and with how many students*

² This chat was originally in Italian and it has been translated by one of the authors of this paper.

28. *Bea:* 3) *they have to be active in the mailing list*
 29. *LittlePrince:* *ok.*
 30. *LittlePrince:* *I think it is fair.*
 31. *Bea:* 4) *the task has to be discussed in the classroom*
 32. *LittlePrince:* *ok.. but what about the exhibition? Do you think it can be done?*
 33. *Bea:* *The exhibition, sure, of course!*

Bea's interventions are aimed at fixing the pre-conditions to participate to the project but at the same time is made explicit the engagement required to any one wants to be part of this community. LP (one of the online tutors) proposes the entrance of some newcomers as an additional resource for the project itself. The rhetorical presentation of the new interested schools in fact stresses some possible outcomes that could provide more visibility to the project (as an offer from the "counterpart" to the Euroland community). Bea (the project manager) starts the negotiation process by stating the conditions for participating according to some aspects specifically connected with the rules established by the community.

b) Shared Repertoire. As shown in graph 11.1, the other two dimensions of the community, the shared repertoire and the common enterprise, have different and opposite trends. At the beginning of the project the community spends a lot of interaction in co-constructing a shared repertoire while the negotiation of the common enterprise is rather low. In the case of Euroland, most of the participants were not used in interacting in such an environment so the repertoire had to be shared under several aspects. Several communicational dimensions have to be explained by expert members to the novices before they could use the communication tools in a proper way and interact with a reciprocal understanding. In the excerpt below, one of the tutors is introducing to a researcher some technological terms.

Excerpt n. 3 (december 15, 1999)³

115. *Clarence:* *this can be caused by a short interruption of the ISP⁴*
 116. [...] *[...]*
 117. *ale:* *(to Clarence) what is the ISP?*
 118. [...] *[...]*
 119. *Clarence:* *internet service provider*
Clarence: *TIn, Tiscali, Iol etc etc*

This excerpt reports one of the simplest aspects of sharing a specialist meaning related to the ICT use. The expert only untangles the acronym and makes some examples to make clear what he is talking about. The next example introduces another aspect of the shared repertoire, closely related to the language used during the chat interactions:

Excerpt n. 4 (November 25, 1999)⁵

207. *Clarence:* *wb Elena*
 208. *Elena:* *what does it mean WB Elena?*
 209. *Clarence:* *=welcome back=bentornata⁶ :o)*

³ The original chat was in Italian and it has been translated.

⁴ When marked in blue and in italic it means that the sentence has been whispered between the two users and the dialogue is not visible in the public chatroom.

⁵ Chat originally in Italian language.

210. Clarence: *it is more convenient to use these abbreviations in a chat*

This example shows how the shared repertoire of chat-based communities strongly depends on how constraints and resources of the communication tool are used. Communication via chat supports a fast follow up of utterances, thus a concise language is required. Clarence uses an expression which is very common in the chat style of talking. Since Elena does not understand it, the tutor not only clarifies the term but he also adds some information related to the culture of chatting such as the reasons for using that symbolic system: the chat talk is a written talk and it has to respond to the speed of talk even if it is typed. This type of interactions greatly influences the dictionary used by the chat-based communities and transforms radically the linguistic terms used. This aspect has to be learned by novices in order to have them interacting in an effective way inside the community.

But there are other communicative dimensions that have to be learnt by the newcomers who enter in a cybercommunity. All the aspects discussed above are related to the shared repertoire and are aimed at introducing the newcomers into chat culture.

In the following excerpt, it is highlighted the complementary process of co-constructing some of the features of the community repertoire. This kind of process arises in dependence of specific interactive situations, when specific needs community are evident:

Excerpt n. 6 (February 8, 2000)

268 Rob *I call MarcoMichela MM ok?*
269 MarcoMichela: *yes*
270 Rob *THANK YOU mm i AM VERY FINE*
oops my capslock :))
271 MarcoMichela: *i'm very happy*
272 Rob *What are you doing MM ?*
273 Clarence: *remember kids :o) THIS IS SHOUTING in a chat :o)*
274 Rob *Good Clarence !! That's the netiquette-rule*
275 Clarence *:o)*
276 MarcoMichela: *we are exploring Euroland*
277 FrancoPierPaolo: *at first, we'll ask information about the trip*
278 Rob *Aha and how far did you came yet?*
Aha FrancoPieroPaolo I will call you FP ok?
279 Bea: *(to Ale) are we attending to a just born rite???*

The students connected during this chat were in front of the computers in dyads. This generated a misunderstanding about who was actually interacting during the online connection. The nickname that the project manager stated for them (and they continued to use it for all the duration of the project) is made by combining the names of the students composing the dyads. One of the Dutch teachers, Rob, proposes the abbreviation of those nicknames, again in accordance with the general role of chat talk to shorten the word. The project manager (Bea) notices the creation of a new element in the repertoire of the community and underlines this event whispering to the other connected researcher (Ale).

Sometimes solving practical matters via the construction of a shared repertoire could affect also the cohesion within the participants. When many users were connected at the same time, it became hard to say goodbye since everybody wants to send greetings and wait for a reply. Euroland greetings were very long sequences of reciprocal "Hello!". Even if the system was

⁶ This is the corresponding Italian expression for welcome.

equipped by an automatic boot (Cicoje) reporting who was entering and leaving the chat, the desire of being polite made difficult to leave the virtual environment in a quick way. Clarence found a way to remark the very last interaction before logging out of the system and, implicitly, to notify that further text addressed to the leaving user would not be read:

Excerpt n. 7 (November 24, 2000)⁷

817. *Clarence: Hello alessandra :o)) see you later!*

818. *Clarence: ;)*

819. *Clarence: again :o) *click**

820. *[Cicoje]: Bye Clarence*

The *click* was a quick and effective way to say goodbye, it was addressed to everybody and it was a good way to solve a relational problem which could affect the personal needs of the users (funny as it can look it allowed users to feel free from politeness rules). The success of the new procedure was immediate and all the users quickly adopted it when they intended to leave the system.

The community interactively constructed further communication symbols and words. Many chat interactions took place at a relational level and different kinds of emotions were shared. For example, the need to have a community built upon strong interpersonal relationships and individual support was expressed by the project manager introducing the costumes of kissing by typing the word “smacks”, that emulates the kisses sounds, in a cartoon style. The co-construction of the common repertoire affected the community at different levels and contributed to empower the other dimensions.

d) Common Enterprise. The chat talk related to the common enterprise is rather low at the beginning of the project. After three months from the start of the project, the trend reversed (see graph 11.1). It may be not a coincidence that at that point most of the repertoire was already shared and negotiated, therefore the language could be finally used to achieve the declared aim (building Euroland). It seems that having a shared repertoire is a pre-requisite before really starting to work for a common enterprise. In fact, only when the effort to have a shared repertoire decreases then the community focuses on the common enterprise.

As soon as the building activity becomes the main activity, the staff has to agree on some fundamental dimension for the building activity itself. Monitoring the building activities means comparing different classrooms' strategies, various building aims, dissimilar pedagogical points of view, and a variety of ideas coming from each participant that have to be negotiated and shared. Having those issues in the foreground changes the content of the chat: main concern is now the project itself and how the building activities can affect the pedagogical goals. In the following excerpt the staff is busy discussing the common enterprise and Clarence, trying to explain his point of view, took Ale and Bea in another 3-D world realized along his line of thinking.

Excerpt n. 7 (January 21, 2000)⁸

308. *Clarence: lets wait the download*

⁷ Chat originally in Italian language.

⁸ Chat originally in Italian

309. Clarence: *then we can take a look around*
310. Clarence: *maybe trying to identify us with kids around 11 years*
311. [...]
312. [...]
313. Clarence: *what do I see ?*
314. Clarence: *a background with big and funny faces ...who are they?*
315. Clarence: *ahh Madonna!*
316. [...]
317. Clarence: *and how is this other guy?*
318. Clarence: *do you see how many coloured teleports⁹*
319. Clarence: *it is really professional*
320. Clarence: *but at the same time friendly, like a merry-go-round*
321. Clarence: *for sure more successful than the Euroland GZ¹⁰*
322. Clarence: *more functional, but kind of cold*
323. Bea: *I understand but our goal (at least mine) is not to build splendid worlds*
324. Bea: *but to understand how do they do it...*
325. Clarence: *I am talking about the involvement*
326. Clarence: *Sorry Bea, I give you an example about music*
327. Clarence: *I kind of play*
328. Bea: *Tell me*
329. Clarence: *I often listen to very good bands*
330. Clarence: *(but it is the same about movies and books)*
331. Bea: *yes*
332. Clarence: *Why some of them make me saying "what do I play for, what do I write for?"*
333. Clarence: *and others, still very good, may be even better*
334. Clarence: *make me feel like I want really badly play?*
335. Bea: *clarence what you are saying is not possible in this project*
336. ale: *I agree with Bea*
337. Bea: *We would need more technical support ... more time*
338. Clarence: *Bea this is a brainstorming, I just say what I think, if it is doable is another question*
339. ale: *I am not sure it should make sense here*
340. Bea: *I am not looking for a marvellous world*
341. Bea: *I want to understand what are the problems when using AW in classrooms*

Again as for the mutual engagement, most of the issues related to the common enterprise were negotiated out of the technology-mediated environment. However, as soon as the online work started to be considerable, the leading staff (tutors and researchers) had to state and agree again on some organisational matters, which aroused from the real practice.

The agreement about the pedagogical aims is mainly constructed by two members (Ale and Bea) that already shared a common pedagogic culture on cooperation inside schools and supported by computers. Clarence, the technical tutor in charge of teaching how to build, was forced at assuming a pedagogical view based on his teaching activity. Initially, his vision was driven by an esthetical paradigm, not shared by the other two researchers.

⁹ Virtual objects able, when clicked, to take the user directly to a certain virtual location, usually advised on the object itself

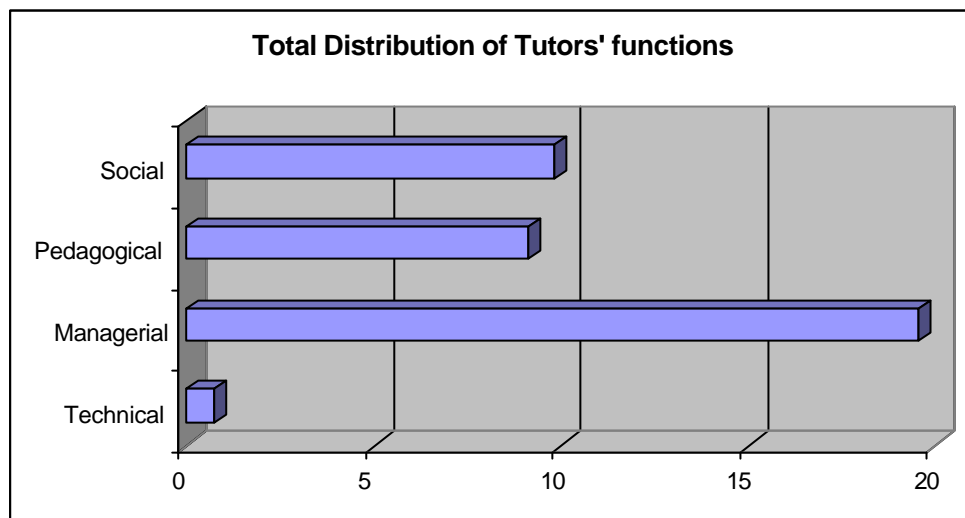
¹⁰ Ground Zero = is the point where users land when connecting to the virtual world

Lately in the project, both counterparts (esthetical and strictly pedagogical) were combined and an agreement was reached.

11.7 How did tutorship impact the community?

During the project tutors, provide to the community, four different types of functions: social, pedagogical, managerial, and technical.

The impact of these functions on community life is significant with 39% of the total interventions coming from the tutors performing these functions. Within the four functions, and from the data collected, the most relevant is the managerial function (see graph 11.2).



Graph 11.2 Distribution in percentage of the four tutorship functions.

Comparing this result to the information gathered from other studies [34], it can be inferred that the relevance of the managerial function is due to the specificity of the chat content.

On-line synchronous communication is more suitable for discussing the organization of the sub-tasks, to make decisions about who and when is taking charge of specific activities, and to assign and share responsibilities. The typical interventions of this function concern those issues.

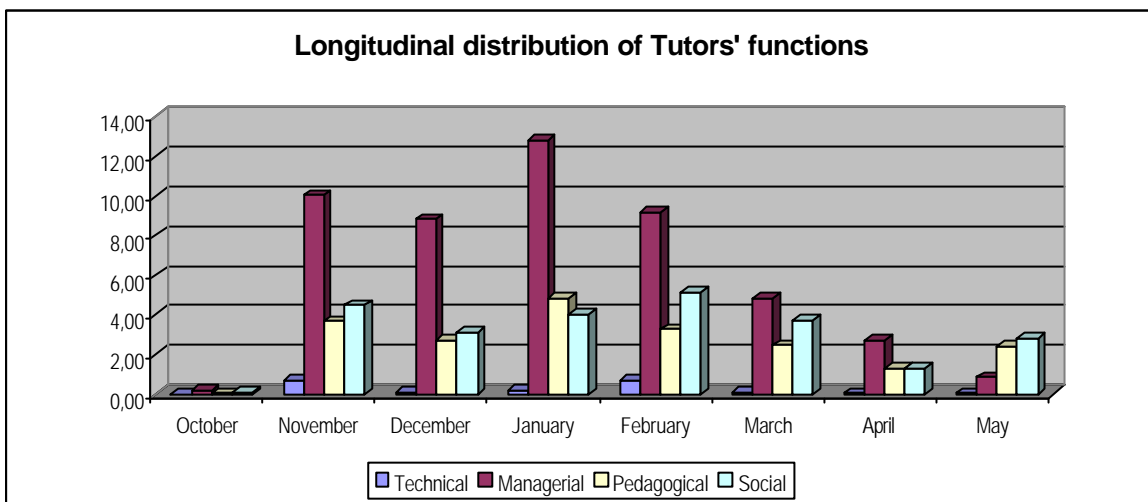
The other functions are relevant in different types of settings and through other communication tools available: within the classroom, in the discussion forum embedded into Euroland, and through the mailing list available for all the participants. In particular, the technical function is performed off-line most of the time, by technicians that provide this type of support without necessarily taking part in Euroland life. The pedagogical function is more central in the classroom context, where there is face-to-face discussion between teachers and students. The pedagogical function is relevant in this community since it has a clear educational nature, but it is discussed only during a few chats. These chats are exclusively dedicated to researchers and teachers and exclude the students. During those meetings, researchers introduced their aims to the teachers and once a shared vision is reached, teachers were delegated to carry out the pedagogical function in their classrooms.

When looking at the longitudinal development of the four tutors' functions (see Graph 11.3), each function appears in a specific pattern changing little over the time. From this graph, is clearly visible that after the first month, all the tutor functions developed rapidly and reached their plateau in January/February. Those months were actually marked by a crisis: the Dutch students dropped the project and new participants were sought. The tutorial effort seems to be meant to support the

community in such a difficult moment. As soon as newcomers arrived (in February) and the cross-national exchange, which was based on the construction of the virtual houses, was restored the tutorial effort started to decrease.

Analysing each tutors' function, it becomes evident that the managerial function is more relevant from the second month on, but drops dramatically toward the end of the project.

The social and pedagogical functions appear to remain stable throughout the project. The technical function is very low as most of the technical problems are solved at computer schools within the real school's setting or by technicians operating directly on the server. This function however, does have a slightly higher frequency during the second month that corresponds with the entrance into the project of newcomers.

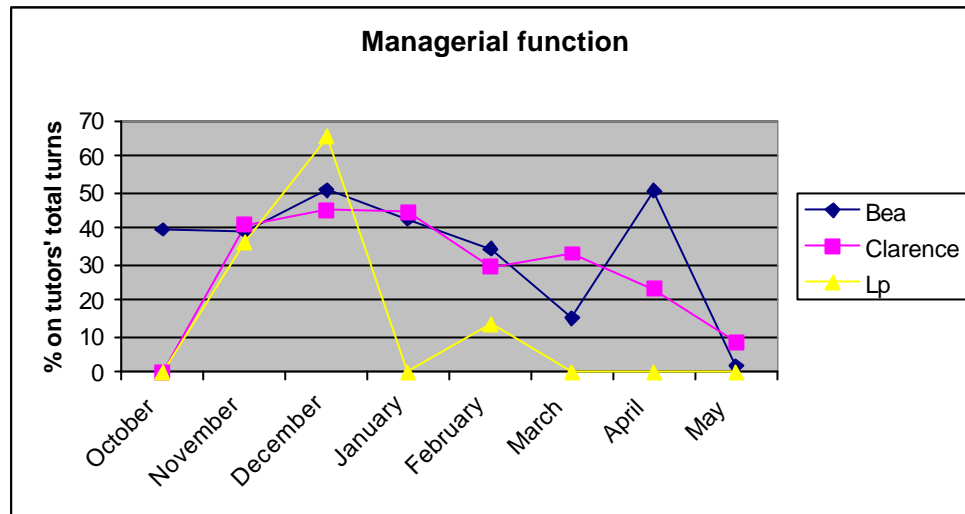


Graph 11.3 How the four tutorship functions developed during the project.

To better analyse this trend, a further investigation was carried out comparing the tutorial function of each tutor (Graph 11.4).

As already mentioned, the managerial function is the most relevant in the project and the graph above provides a further reason for this: all the tutors were initially prepared to undertake this function. Even Lp that was responsible for commencing the project maintained a reasonable high managerial function within his overall performance.

By examining the chats where this function appears, it also becomes clear that there are different types of management incorporated within this role. The excerpt selected and reported below is a good example of the various ways in which the managerial function is used.



Graph 11.4 Managerial function covered by each tutor throughout the project.

Excerpt n. 8 (April 19, 2000)

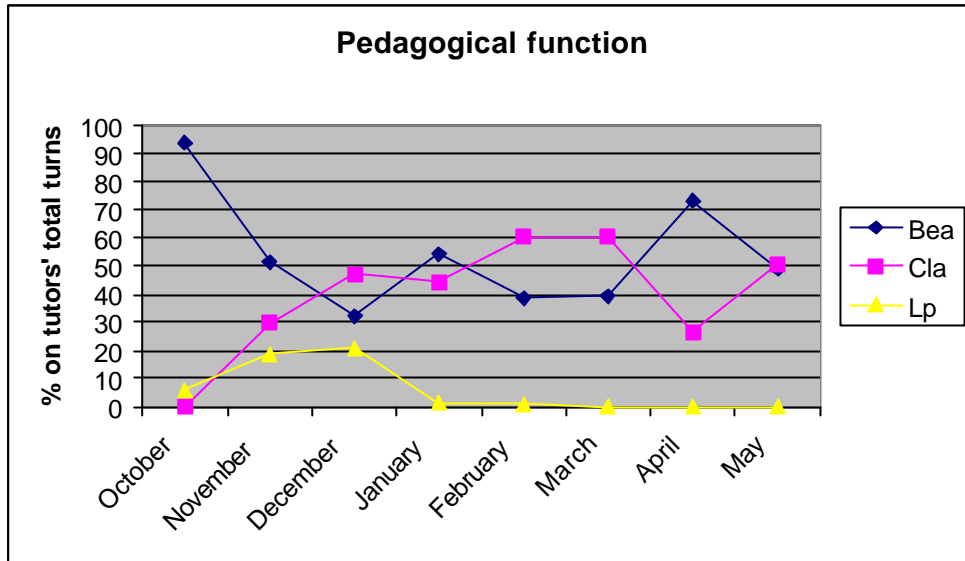
- 258 *Bea* *clarence can you help danilo ??*
 259 *Clarence* *danilo tell me. Manta, coccolini wait the bridge should begin where is your arch*
 260 *Manta* *ok*
 261 *Clarence* *here :o)*
 262 *Danilo* *yes, so : I am on the 883¹¹ web site and I would like to listen to a song but I am not able to do it, how do I do it?¹²*
 263 *Clarence* *so it ends right on the entrance of other building*
 265 *Manta* *ok*
 266 *Bea* *ehi Bart..*
 267 *Bart* *yes Bea....*
 268 *Bea* *you may think of a bridge between your building and the NL music*
 269 *Bart* *Yes I will. I am already thinking..... How is the house of NL music?*
 270 *Bea* *who is now connected from Modena???* *Let's take a look*

In line 258, Bea fulfils her managerial function toward the other tutor (Clarence), asking him to help one of the on-line students. Later, in line 268, Bea is playing the managerial function toward one of the teachers connected, suggesting to him a possible activity to be performed in the virtual world. In the following line (269), Bea is checking who is connected, accomplishing yet another aspect of this function.

The managerial function seems to decrease over the time, with the only exception being Bea who experiences an increase in this function in April. The event that increased Bea's managerial function was the imminent closure of the project. This required the accomplishment of all the virtual houses and, given her role as project manager, Bea actively encouraged all the participants to finish this task on time. The last month of the project comprised an evaluation of the project outcomes and as a consequence Bea's managerial function was not required.

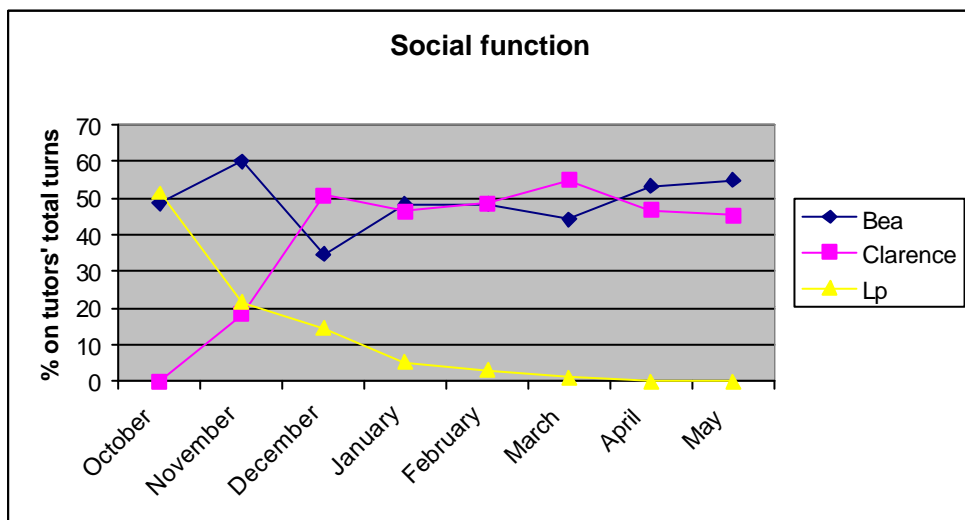
¹¹ This is an Italian band. Those students are building the house of music

¹² This utterance was in Italian and it has been translated in English by the authors of this chapter.



Graph 11.5 Pedagogical function covered by each tutor throughout the project.

With respect to the pedagogical function, at the commencement of the project Bea is more dominant in this area. This could be due to her role of project manager and because she is acknowledged by her peers as an educational expert. Within a few months Clarence is also able to perform the pedagogical function at the same level as Bea does. This enables the pedagogical function to be kept at a constant level, as the two tutors are able to alternate an online presence with each other.



Graph 11.6 Social function covered by each tutor throughout the project.

The same balance found for the pedagogical function characterizes the development of the social function. After a few months from project commencement Bea and Clarence are again able to support each other in this function (see graph 11.6). The tutors are interchangeable along the social and pedagogical functions and this makes stable the trend of both functions during the project (to compare the social and pedagogical functions see graph 11.2). Graph 11.6 displays how from mid project on, the technical function becomes a specialized function of the tutor

Clarence. This is in fact, the only function within this community that becomes exclusive to one of the tutors.

One of the aims of the community was to create specializations and specific roles but it should not necessarily be linked to one person. The intention was to have functions clearly identified but interchangeable so that the efficiency of one function was not dependent on the presence of a certain tutor. Beside the technical function, this result has been achieved for all other functions. In fact the two tutors working on the project (Lp, after the start up, monitored the project mainly off-line) were able to substitute each other and to use different functions simultaneously. The excerpt below contains an interesting example of this.

Excerpt n. 9 (January 21, 2000)¹³

24. *bea:* *lets see ... you are already able to build, aren't you ?*
25. *Valentina:* *well ...*
26. *bea:* *but it is very easy*
27. *bea:* *lets go to the Rome area*
28. *bea:* *(to EDUHML Ivo) would you have some time to help one of the students from Rome?*
29. *Valentina:* *yes, I know the theory ... but is the practice that makes me worry*
30. *bea:* *(to EDUHML Ivo) Valentina .. she is really nice*
31. *bea:* *click on the panel with the word Rome on it*
32. *Valentina:* *ok, lets go*
33. *Valentina:* *tell me if it is right*
34. *bea:* *if it is right what?*
35. *Valentina:* *I click on an object, I duplicate it*
36. *bea:* *very good*
37. *bea:* *lets duplicate one now*
38. *Valentina:* *and I « transform » it in the object I want*
39. *bea:* *ehi you are very good, do you see that you know it*
40. *bea:* *for the rest you need only some practice*
41. *EDUHML Ivo:* *I suppose she is from History :)*
42. *bea:* *you know how to look for the objects, right ?*
43. *Valentina:* *yes, yes, so far yes*
44. *bea:* *(to EDUHML Ivo) well from Art - I am talking about Valentina*
45. *bea:* *(to EDUHML Ivo) come over :)*
46. *bea:* *(to EDUHML Ivo) join us*
47. *EDUHML Ivo:* *OK*
48. *EDUHML Ivo:* *whisper*
49. *Immigration Officer:* *You are being joined by EDUHML Ivo.*
50. *bea:* *so, valentina how is it going?*
51. *bea:* *Hello Ivo !!*
52. *bea:* *Hei Valentina this is Ivo (ti presento Ivo)*
53. *bea:* *Ivo this is Valentina from Rome*
54. *EDUHML Ivo:* *I did understand that!*
55. *EDUHML Ivo:* *Pleased :)*
56. *Valentina:* *well, I tried to build a wall*
57. *bea:* *she is not that familiar with building*
58. *EDUHML Ivo:* *Me neither :))*

¹³ This excerpt was originally in Italian

59. *Valentina:* *hello ivo!!*
 60. *bea:* *(to EDUHML Ivo) this is one of the things you are supposed to do here:
 tutoring novel builders*
 61. *bea:* *(to EDUHML Ivo) right?*
 62. *EDUHML Ivo:* *OK*
 63. *bea:* *Ivo is very good in building*
 64. *bea:* *he is an expert*

This excerpt shows how Bea, at the beginning, replaces Clarence in giving instruction about how to build virtual objects. Bea also used the social function when asking Ivo (one of the Dutch students) to support Valentina (an Italian student) in building. Ivo was an expert student since he was previously involved in a similar school experience based on AW. For this reason Ivo agreed to function as a peer-tutor. This was congruent with the aim of the project *not* to create a rigid leadership but rather to transfer as many different competencies to all participants and to have *active* students. Within the same excerpt Bea carried two functions simultaneously: the pedagogical one used with Valentina and replacing Clarence that was usually in charge of teaching how to build, and the social function supporting the interaction between the two students.

11.8 How do the on-line tutors sustain the development of the community?

Tutors supported the community of practice dimensions by facilitating its development in different ways. As well as in face-to-face communities, the tutors act as expert members who can legitimate the participation of the peripheral ones. By doing this, tutors act as cultural mediators inside the community by guiding novices, showing rules, and defining the common enterprise. How is tutors' action carried on? How do tutors sustain in a concrete way the community? This section will show how tutors' intervention have effects on all the fundamental dimensions of the community: infact they act in specific ways defined both by the features of context and by the culture of that particular community.

11.8.1 Legitimizing the novices' contribution to the shared repertoire.

The promotion of novices' interventions is one of the core strategies used to support the newcomers' sense of belonging to the community. This is illustrated in the following excerpt.

Excerpt n. 10 (December 15, 1999)¹⁴

- 81 *Ale* =:0
 82 *Clarence* ahahahhhahahaha !!!!!!!
 83 *Ale* does it work to express wonder ?
 84 *Clarence* see, you started creating !!! Ok I'll go back
 85 *Ale* Am I good?
 86 *Clarence* do join to me if you like
 87 *Ale* ok
 88 *Clarence* Yes, you are good:o)

For the first time Ale is producing new *emoticons* – symbols used to smile ☺ or to express

¹⁴ This excerpt was originally in Italian

sadness ☹ – and she asks for feedback about the interlocutor’s comprehension. The personal contribution to the shared repertoire is legitimated by the tutor’s intervention also allowing participants to create new symbols, introduced into the community repertoire via “permission” of the tutors. A previous phase of this tutors’ role concerned the sharing of meanings of the repertoire used. For example, the “join” request (line 86) that refers to an option offered by the software, is already in use and does not need to be negotiated anymore.

11.8.2 *Using leadership to define a common enterprise.*

The managerial function is used to strengthen consensus around the ideas presented via chat to improve individual involvement in the shared enterprise. Tutors know that awareness about a common general enterprise has to be fostered in order to facilitate the interaction between participants carrying on different sub-tasks and diverse building projects.

The common enterprise is mostly intended as a dimension that has to be shared first at the adults’ level. In this sense Bea collects students’ proposals and then asks for consensus directly addressing all the teachers who are connected at that time:

Excerpt n. 11 (October 13, 1999)¹⁵

120. *Bea:* *Now I am taking notes of your ideas and*
121. *Bea:* *I will post a message about it into the mailing list*
[...]
125. *Bea:* *I will ask to all the others what they think*
[...]
127. *Bea:* *what do you think of this idea?*
128. *Mantastrega:* *it sounds good... I like it*
129. *Bea:* *ehi Giovanni we would like also to have your opinion*
130. *Bea:* *Did you hear the ideas proposed by mantastrega?*
131. *Bea:* *and you Modena??? Do you have any suggestion?*

The project manager tries to share the proposal of one classroom with the whole community by starting a discussion around the proposal. In the tutor’s representation, the chat is not a suitable to deepen the discussion, because of the speed of interaction. So she tries to keep the users’ attention (also that of those not connected at that time) by moving the discussion to another medium, the mailing list, where each “speaker” can find “voice”

11.8.3 *Defining some behavioural rules affecting the mutual engagement.*

Mutual engagement arises in the community as a need expressed by members. The mutual engagement in the Euroland community has been built around affective involvement of the members. The online tutors sustained the development of this dimension in many ways (like creating warm ways of saying hello and goodbye, addressing to young students like pets). But sometimes the definition of the boundaries of this involvement is not agreed and the definition of the mutual engagement is turned in a more concrete perspective.

In the excerpt below some Dutch students are expressing their good feelings to all connected users:

Excerpt n. 12 (November 3, 1999)

¹⁵ This excerpt was originally in Italian

463. popeye: *I love you bea*
 464. bea: *I love you too :))*
 465. zorro: *Are you crazy norm ?????*
 466. Mantastrega: *bea, do you have a bew love ;-))?*
 467. Mantastrega: *new..sorry*
 468. norm: *I love you I love you I love you little prince*
 469. zorro: *Do you really love them little Prince*
 470. popeye: *I love you not norm*
 471. norm: *I love you not popeye*
 472. popeye: *Hello mantastrega*
 473. Mantastrega: *hello popeye...*
 474. norm: *Hello little prince*
 475. Milano: *little prince, we can see you*
 476. Mantastrega: *but I'm Arianna...*
 477. LittlePrince: *so....what's going here?!? what is all this loving stuff?!? we are supposed to learn here!! :))*

The way the two on-line tutors are managing what is going on in this moment shows some core problems about sharing tutorship in a community. Bea and LP have (according to their own roles among the community) different responsibilities and they respond to the students' utterances in a different way. Bea picks up the students' game about sharing warm feelings for each other and legitimates the game by participating and replicating to the "love affaire". After Bea's intervention a lot of "love" continues to be shared among students. LP, the technical supporter, makes a humoristic intervention that stops the love sequence. The intervention of LP states the main aim of meeting and by using the pronoun "we" he addresses everybody connected. LP's focus on the project in terms of learning requirements shows a personal view of the mutual engagement different from that of the other tutor¹⁶.

11.9 Conclusions

The study presented in this paper describes the development of a community of practice in a virtual environment. The results showed how the fundamental dimensions of the community develop and shift according to the community needs and life. The conversation analysis allowed demonstration of how these dimensions are co-constructed via chat interactions and how newcomers are supported by expert members in the project culture and in the communicative rules. Results show that the development of the fundamental dimensions of the community are strongly dependent on the life and needs of the community itself. The technological solutions are used in a strategic way according to the members' aims time by time.

The analysis of the interactions showed also the relevance of the tutors' role in leading and sustaining the community and its development. For example, based on their special status, tutors have the power to legitimate others' interventions and to define the modalities of participation. These results are on line with the studies on non-mediated communities [9, 18], but in the case we presented here tutors, as expert members, have the possibility of using specific interactive resources offered by the 3D CVE and by participating to the chatters' culture.

¹⁶ For the analysis of the specialist interventions of each tutor see also Ligorio, Talamo, Simons (in progress).

The analysis of tutors' functions showed that during on-line interactions different functions were recognizable but not enacted as rigid specializations. This was especially true after the community basic dimensions had been established and the repertoire of all members (including that of the tutors) had been shared. The specialist function became visible only along the technical dimension, where a specific competence is more recognisable. More studies seem to be necessary about the integration of multiple sharing of tutoring functions.

The Euroland project is an example of how a "natural" group, still virtual in the sense that it is composed by people resident at a distance and populating CVEs, realises a common project, shares activities and aims and becomes a real community. Some of the dimensions are co-constructed outside the virtual environment, but data show how the specific interactive tools can be used by the members as new and additional resources to sustain and develop basic dimensions.

11.10 Acknowledgements:

The Euroland project was funded by the European Community, Training and Mobility of Research (TMR) Programme Marie Curie Research Training Grants (7th call) Proposal n. ERB4001GT975495.

The data presented in this article were categorized with the help of Katia Iorio and we thank her for the fine and patient job. We also like to thank Prof. Robert-Jan Simons (University of Nijmegen) for his supervision on the project and the Garamond Company for its technical support.

Although this paper is based on a strong collaboration among the three authors, we like to specify that each of them took particularly charge of certain parts. The first author designed the whole article and presented the results about the community development, the support offered by tutors to the community, and the conclusions. The second author wrote the theoretical discussion and the objectives. The third author described the Euroland project and elaborated the results about the tutorship impact.

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