THE EXPERIENCE OF VIRTUAL TEAMS

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Abstract. *The virtual work deeply modifies establish habits of work in team, therefore the experience is lived deeply not to be physically together in workstation while tasks are carried through. This new form to work extends the concepts of space and time. In this context, innovations in communication area and computer science today generate new behaviours and new organization styles resultant of news half of dissemination of knowledge and new social interactions. Thus these innovations in the services of communication nets come reinforce cooperative work, especially the based one on CSCW (Computer Supported Cooperative Work). This article presents an analysis of application boarding of CSCW in a virtual environment developed by two separate work groups for the distance, a group in Brazil and another one in Portugal, developing a referring cooperative work the solutions of problems control of necessary inputs assembly lines of refrigerating balconies. For this studied environment the following basic activities had been considered: Argument: space for debate, formulate questions and present suggestions; Links: space to include Web addresses, fomenting the research; Mural: area destined for messages to the community; Material: place to store archives of interest the group; List of the members: list of all the members registered in the virtual space. The contribution between members contributed for the growth and positive valuation, therefore besides getting resulted differentiated in relation with that they would be gotten by means of individual effort, the tasks had been developed on a constructive dependence in terms of valuation of the other and the confidence, that inside induces a care and a collective identification of objectives the project.*
Keywords*: Virtual teams,CSCW*

1. Introduction

We live in an age of deep changes in the politician, economic, technological, social and personal values fields. The high complexity and the speed of information, the interdependence of the phenomena, the development of an economy that surpasses and knocks down borders and regionalisms, one raised technological development, the high complexity among the companies and the increasing requirement of consumers can be cited as aspects of the contemporary time. The speed of information transmission knocks down existing barriers before (Trope, 1999).

The search of flexibility in the organizations starts to be a necessity, from the prove that the structural rigidity of the traditional organizations is not more suitable with the current reality. This new format of organization, composed by small work groups that do not share the same physical space, can be modified quickly in reply to the demands provoked by the environment. The agility with that these groups can be created and a defect makes possible the use of the individuals capable of adding value to a determined task, independent of the localization of any these individuals.

It is in this context of technology and globalization that the space is open for the sprouting a new type of team: the virtual one. These teams are being used each time more frequently in view of the necessity of information and faster answers, also operating the fusing and the pressures for the reduction of prices and stated periods.

The virtual work change deeply root habits of work in team. The virtual teams transmit and receive information between its members through the intensive use from the Technology of Information.

The virtual teams live deeply the experience of not being physically together in the place of the work, while the tasks are being carried through. This form excites the possibility that the members of the group will never communicate directly (Pithon, 2004). These teams are constituted generally by people with different formations or points of view, which interact using a cooperative form changing information and sharing experiences, with the aim of fulfilling a set of requirements (Moraes e Zorzo, 2000). Beins on necessary condition to work in this organization environment, the contribution, information exchange, communication capacity, the respect to the individual differences, the exercise of the negotiation, are important requisites for the cooperative work, based on CSCW mainly.

Thus, the main objective of this article is to tell the experience lived deeply for two virtual teams of work, one in Brazil through disciplines of Collaborative Work in Projects of Technological Innovation of the Course of Master's Degree in Technology at the CEFET-RJ, and another one in Portugal, partnership with the pupils of the course of Industrial Engineering on University of Minho. In the experience, knowledge had been combined using the tools of

groupware, aiming at a solution for the problem of control of the necessary raw materials, in the refrigerating assembly lines of balconies of portuguese company.

2. Literature review

The CSCW can be defined as a discipline of research of techniques and methodologies of work in group, and the forms that this technology can assist the work (Greenberg, 1991; Pithon, 2004). CSCW systems supply a support to people to interact cooperatively, with this, making possible the potential increase of involved work groups in the accomplishment of common tasks (Ellis et al., 1991). These systems can provide to the participants of a group do not need to work even on a same localization, and/or even at the same time.

The term groupware appeared as synonymous almost of CSCW, however groupware is the software that supports or makes possible the cooperative work. The groupware systems use the computer to support groups of people pledged in a shared environment.

Cooperate is before everything a social act, therefore, it requires all facial of human beings interactions, since the spoken language until signal languages, passing by the writing and the facial expressions. This manner, the cooperative work can be defined as all and any activity that is developed in set by many people, forming groups and the interaction between them occurs to reach a common objective (Borges, 1995).

The cooperative work involves exchange of differentiated information by the participants of the group. This exchange can occur between individuals, or individual and group, and so one, figuring the communication between them the key point to occur cooperations. This way, the possibility and the easiness on sharing and exchange the information is the base for the success of a groupware application.

Distributed cooperatively environments allow that a group of users or applications geographically dispersed, can use some computational resources so that the solution of problems can occur jointly, becoming more efficient. As contemporary example of these environments, can be cited the virtual groups of work. In these environments the communication can be organized and to happen with the participants located on the same or different places. When the group meets on same place, the communication occurs on face-to-face way or through systems of support the meetings (E.g.: talk is an example of face-to-face communication). Figure 1 presents matrix time x place, that states the forms to communicate between members of a group.

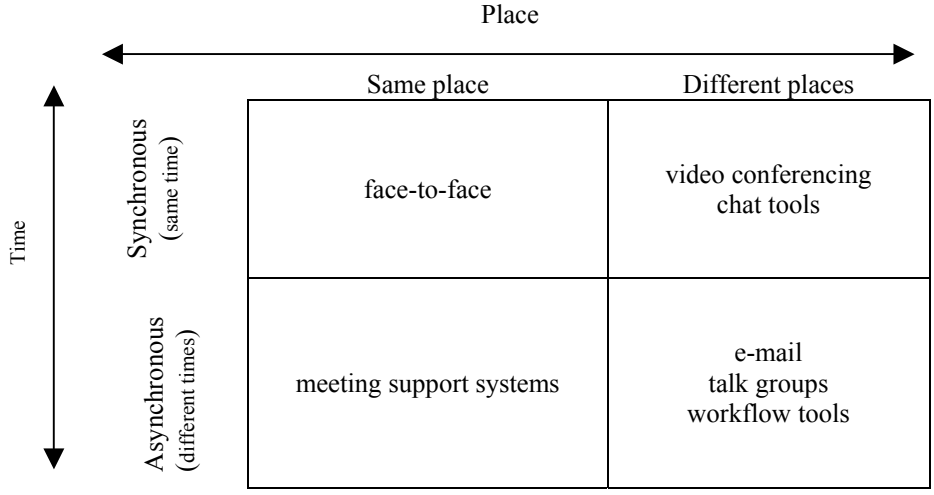

Figure 1. Matrix time x place

According to Lipnack e Stamps (2000), is undeniable that, for the virtual teams it is much more difficult to get success than the traditional face-to-face teams. Egos, personal power games, poor self-esteem, feelings and opposed opinions, leadership absence and reliable lack, for example, contribute for virtual teams weakness. Or, when the communication is not being efficient, it is necessary that people take steps to recoup them.

Some aspects must be on consideration as essential of this new form of cooperative work, to make possible the success. As follow, some items are :

• to establish reliable relationship: without mutual trust between and inside of teams, the accomplishment of an efficient task is impossible. Confidence is an indispensable condition to the optimization of this cooperative system;

• clearly to establish the functions of each team member: without this agreement and sense intention, the teams do not reach the results that they could experiment;

• support technology: to make possible the any-distance work, a communication infrastructure is necessary, supporting all the types of tasks and necessary interactions for the accomplishment of works and teams integration. The tools that the virtual teams had used in this experience are described in the following section;

• to use the advantages of the workstation: for better that could be the interaction environment of the virtual teams, it is necessary the face-to-face relationship at least in some occasions: or to firm a reliable relationship, either simply to know physically with whom to work. Behind all this technological net, will always exist many human beings, with their feelings of curiosity, agreement, mood and respect.

3. Creation and Description of Teams

Two groups had been created for this experience: the brazilian group and the portuguese group. The brazilian group was composed by five students, i.e., three students of the course of Master's Degree in Technology and two students of Scientific Initiation. The five portuguese students were all of the course of Industrial Engineering. After the definition of the groups, it was settled the definition of the common objectives of each group. Established thus, the brazilian group fit the elaboration of a methodology for normalization and codification of industrial parts, that could be applied in the portuguese company manufacturer of refrigerating balconies. The portuguese group fit the specification and the mapping of the flow of the productive process of the brazilian red ceramics. However, for reconsideration of the groups, it was re-establish that the group in Portugal would act as a virtual agent of the brazilian group. This way, the experience was reduced for an elaboration of a methodology done by the brazilian group in set with the portuguese group, a methodology to implant bar codes for all production line for a portuguese industry of refrigerating balconies, tying them to all other sectors of support and operation of this company. The diversity of bases on the methodology were supported and in agreement with the norms of codification conducted by ABNT (Brazilian Association of Techniques Norms), and by INMETRO (National Institute of Metrology, Normalization and Industrial Quality), and settle with the objective traced for task.

In the following section, the synchronous and asynchronous of groupware tools used by the members of the two virtual teams will be shown, in the accomplishment of the experiment, in reference to Figure 1.

4. Colaboratives Tools

For accomplishment of this experience synchronous and asynchronous tools of groupware had been used. In the synchronous communication, the participants of the work groups are changing messages simultaneously through the Internet. The tools used in this modality were MSN Messenger (Fig. 2) and Skype (Fig. 3).

Initially the use of MS Messenger was foreseen only, but with configuration problems on the server on CEFET-RJ, that does not allow the use of the voice resource, we were obliged to use Skype to surpass this imperfection. Skype has as main characteristic to be a program peer-to-peer (P2P), that is, each machine is connected directly with the other machine, without having the direct necessity of a server. This characteristic confers to Skype one better quality of voice. However as disadvantage, the camera absence can be cited.

In the asynchronous communication, the participant will go to act collaboratively, to exchange ideas, but not at the same time. In this case, the subject in discussion does not demand an immediate solution, but it demands proposals and the opinions that can be managed and be stored by the system. The main tool used in the asynchronous communication for the groups was the e-mail.

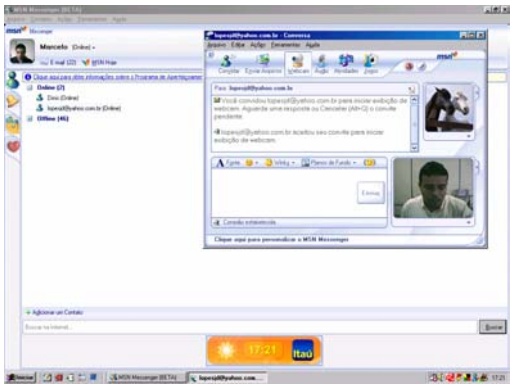

Figure 2. MSN Messenger

Figure 3. Skype

5. Experience Plan

The experience had its beginning on September 2004 and finished in December on that exactly year, because this period includes the beginning and the end of the period of learning trimester of disciplines of Master's Degree that it made possible this interchange. Initially a debate group in the Internet was created using the site

(http://br.groups.yahoo.com/) of Yahoo, called CEFETUM, (http://br.groups.yahoo.com/group/cefetum/) where the participants after being registered used to share archives, to co-ordinate meetings, to keep contact with the group and to argue on pertinent topics to the project in question, passing then to be this address our data base. This form of asynchronous communication, where the participants are not on line, was important to surpass the difference of hourly spindle between the groups and its pairs. With the use of software described in section 4, the lessons and meetings of work had been given on-line. On the environment used the following basic activities had been considered:

• Discussion: debate space , question formularizations and solutions presentation;
• Links: space where were included web addresses, fomenting the research;
• Mural: available space for allocation of archives to work group interest;
• List of members: list of all the members duly photographed and registered in the virtual space.

Figure 4 presents the number of interactions effected by the brazilian group with the portuguese group, during the collaborative activities. September was dedicated to the intermeshing between the brazilian and portuguese groups with relation to the adequate use of the collaborative tools described in section 4, so that all the members of the group after a period of tests stow in one same level of learning. Also in this period, the pupils had been guided to mark the meetings in specific dates and schedules in order to surpass the problem of hourly spindle that in this period of the year presents four hours of difference. The experience had its beginning positively in October, where the exchange of information was very intense, drawing out with lesser intensity in November and December. All the messages exchanged between members of the group in elapsing of the experience were chores for the orienting professors of brazilian and portuguese groups with the objective to evaluate the evolution of the experience, and also to identify possible technical problems that could confuse the good course of the experience, problems as these ones not always evident for the group members.

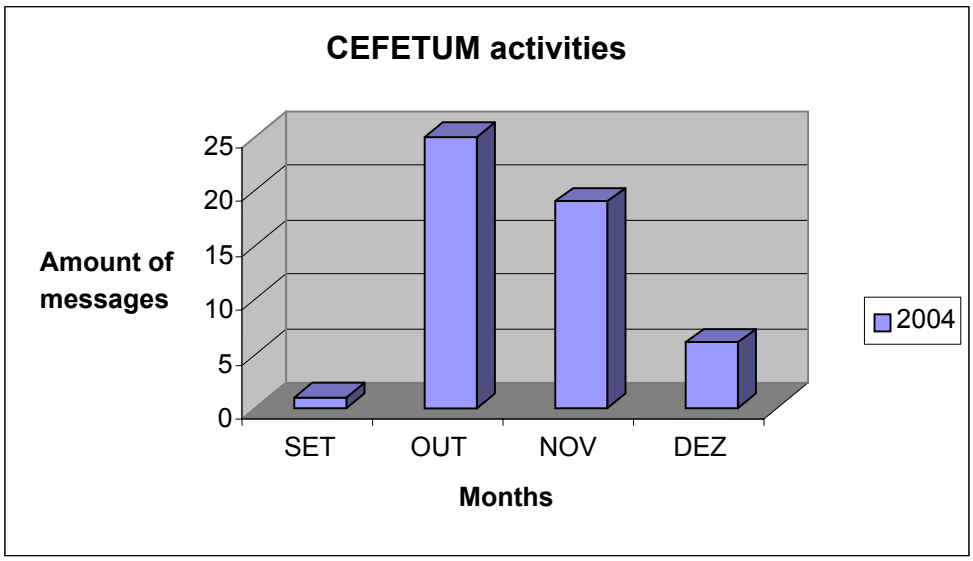

Figure 4. Activities of CEFETUM

The general objectives of the experience can be summarized:

• To create the opportunity to the pupils of the Master's Degree and Scientific Initiation, the knowledge of the reality of a high technology company inserted on European Union context, proposed through the interchange university-university;
• Implant of methodology to control the necessary raw materials for assembling line of refrigerating balconies produced under order;
• Establishment one of the main beddings of the virtual teams work, the bond of the confidence between the members of the collaborative group in the academic and professional experiences of each integrant of the group.

6. Results Analysis

In such a way, dealing with this inedited experience in Brazil as in Portugal, involving simultaneously, two work groups, with applications of a diverse gamma of softwares, that is, two synchronous softwares (MSN Messenger and Skype) and an asynchronous software (e-mail), the results had surpassed the expectations.

As positive points of this cooperative work can be cited:

• Establishment of a productive cordial approach inside the groups, based on the best social principles of the relationship;
• Perfect engagement between the domain the technology and the knowledge of the contribution tools;

- Ample exchange of pertinent knowledge to each culture;
- Easiness with the language;
- Cultural aspects relative to the different abilities due to the gap of knowledge and existing experience between the pupils of master's degree brazilian and the portuguese pupils of graduation.

The main negative points had been:

- Lack of support and information caused by the portuguese company, not supplying with all necessary information to the project. Causing to the two groups an incomplete planned task. That is, the visualization of the plan by refrigeration company directors was not reached.
- External interruptions as web connection falling, as much in Brazil as in Portugal.

7. Conclusion

The base of contribution and cooperation is basic for the establishment of relations in the teach-learning process. Without this change, the students will continue to leave its courses with difficulties to adapt the changes demanded for the market.

One of the basic aspects for the good development of a work in group is the contribution among its members. In the collaborative work, it is basic that the activities are argued in set, still that the tasks are divided into sub-groups or individuals, the whole will only be coherent if the parts were tuned in, that is, all the members must have knowledge and "collaborate" on the development of each part of the project. True partnerships are formed, that for definition, everything that is realized has a common objective. During the exercise, this contribution was beyond expectancy.

The contribution opens a space to the growth and the positive valuation for the individuals, therefore besides getting differentiated results on relation with those gotten by individual efforts , the relation among the group members operates on a constructive dependence in terms of valorization of each other, that induces a care and a collective identification on a distributed net with world-wide dimensions.

With the course of the tasks, anchored first on the conceptualization of CSCW and later on the concepts of normalization, the foreigner teams, had lead moments of intense productivity with respect the information, knowledge and learning, leaving explicit the condition of the inexorable necessity of attributes from confidence, concept some times looked with suspicions, objective exercised on these personal-professional relationships inside and between the teams.

With an explicit antagonism considering what was proposed by Lipnack e Stamps (2000) that they relate for difficulties for the virtual teams being much more difficult to get success than the traditional face-to-face teams. Egos, personal power games, poor self-esteem, feelings and opposed opinions, leadership absence and reliable lack, had situations very well bypassed by all group members. Instigating at least, a future verification due to the little time for interactions through MSN Messenger, the meetings have been characterized by objectiveness, preventing the undesirable.

The registers generated during the execution of the experience (generated times of And just accomplishment, notations, comments, interactions and documents) must, together with the stories of group members, be the raw material for the next experience.

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