GROUPWARE TOOLS APPLICATION EXPERIMENT IN VIRTUAL ENVIRONMENT

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Abstract*. The Computer Supported Cooperative Work (CSCW) is a research discipline appeared from the evolution of the term 'office automation' and from the information technology, using the idea of simultaneous processing of a Company different functions and activities in the competitive engineering supported context using group communication tools. This article introduces an application experience of groupware tools in the modeling process of a collaborative workin in virtual environment developed by the Universidade do Minho – Portugal. The adopted approach for the experience description includes two stages: in the first stage, the bibliographical investigation is accomplished regarding the treated subject. In the second one, experiences are reported relatives to groupware tools application in a collaborative work for evaluation costs methodology development. The research forms used in experiment were reports of both observation and analysis for the synchronous and asynchronous communication. In other words, the face to face communication wich allowed participants to act in collaboration, exchanging points of view and experiences relatives to evaluation methodologies for industrial cost applied in the cooled containers industry.*

Keywords: *collaborative work, groupware tools, information technology*

1. Introduction

With the advent of globalization several changes appeared in society, one of them being the capability of informations communicating and treating, with an increasing complexity of problems connected to tasks fulfilled in work environments. Therefore, the available time to solve those tasks is every time lesser. Those two aspects are causing the increasing of tasks carried out by the multidisciplinal teams. These teams are constituted, generally, by persons with different formations, or points of view, that interact in the cooperative form, exchanging informations and sharing experiences, in order to carry out a set of requirements (Dietrich apud Moraes and Zorzo, 2000). Collaboration, exchange of information, capability of communication, respect to individual differences, exercise of negotiation, are necessary important requirement conditions for cooperative work in this organizational environment.

In this context, this environment evolution made joining activities possible for people who are not physically in the same work place, through a distributed communication system, for example, the Internet. For it happens, it is necessary that applications have characteristics that make easy the interaction between users and that supply communication and collaboration services among them. As the communication rule is fundamental, it may be carried out by several forms, through face to face meetings or electronic ways. At the present time, communication network services have been increased by the cooperative work mainly based on Computer Supported Cooperative Work - CSCW (Pithon, 2004, pg. 20).

This work reports the experience developed at the Collaborative Work for Technological Innovation Projects discipline from the Master Degree Technology Course of CEFET-RJ, through the application of groupware tools, in partnership with the University of Minho – Portugal. The adopted approach for the experience description included two steps: (a) bibliography investigation referring to the treated subject and (b) experience report regarding groupware tools application in the collaborative work for development of supporting methodology. Investigation forms used in those experiments were both observation and analysis of the synchronous and asynchronous communication reports, in other words, the face to face and that one communication which allowed participants to collaboratively act, exchanging ideas and experiences on methodologies of industrial cost applied in refrigerated balconies industry.

2. Workgroup Applied Technologies

Technological advances in telecommunication area and computer science are promoting changes in world-wide enterprises management. This new scene caused a paradigm break in the organizations structure that started to look for a more agile structure, able to take into account these changes and also the needs of a more discerning market. In this way new technologies were developed and studies redirected for incorporate the productivity and quality growing demand on groups performance in and for the workship.

Development of these technologies started the called “office automation”. The idea was the simultaneous processing of different Company functions and activities by work groups. That happened due to concernment regarding necessity of increasing productivity in Companies where the fulfilled work is predominantly accomplished in group.

The studies were then directed to groups behavior analysis during their activities development, with the objective to develop more adapted technologies giving support to cooperative work. Thus, the term “office automation” was gradually substituted by Computer Supported Cooperative Work (CSCW) (Moeckel, 2003). In the group work environment the communication role is basic, being the work able to be carried out through "face to face" meetings or by electronic ways.

At present, services of communication networks, according to competing engineering, have increased cooperative work, specially that one based on CSCW supported by communication tools in groupware groups. The term groupware appeared almost as a synonym of CSCW, however groupware is the software that supports or makes possible the cooperative work, meaning that these groupware technologies are the responsible for supply the shared environment for distant work capability (Moraes and Zorzo, 2000). Moeckel (2003) defines groupware as a term meaning the technology – hardware and / or software – that offers the support for the cooperative work. Groupware may be defined as any computerized system which allows groups of persons to work in a cooperative form in order to achieve a common objective, increasing their productivity (efficiency plus effectiveness) (Cruz, 1988).

According to Moeckel (2003) main applications of groupware systems in a Organization are: (a) systems for decision support; (b) systems for meeting support; (c) cooperative editing softwares; (d) systems for synchronous communication - instant messenge, chat and videoconferencing systems; (e) systems for asynchronous communication – electronic mail, forums, and blogs; (f) systems for electronic documents management (EDM); (g) workflow manager; and (h) shared workspace. Joining these applications with questions regarding workgroups interaction previsibility, it is possible to allocate the applications for groupware.

These technologies make possible cooperative or collaborative work of people on a synchronous form – real time; or asynchronous – differentiated times for distant work, according to Table 1.

Table 1 - Applications for Space and Time Dimensions Classification

Space and Time Dimensions	Same Place	Different Place
Same Time	• Decision Support System • Meeting Support System	• Decision Support Systems • Meeting Support Systems • Cooperative Editing Softwares • Synchronous Communication Systems • Instant Message Systems • Chat Systems • Videoconferencing Systems
Different Time	• Electronic Document Management (EDM) System • Workflow	• Electronic Document Management (EDM) System • Workflow • Cooperative Editing Softwares. • Asynchronous Communication Systems • Electronic Mail • Discussion List • Forums • Blogs • Shared Workspace • BSCW • Quick place

(Source: Moeckel, 2003)

3. Groupware Tools Application

The adopted approach for the experience description included two steps: the bibliography investigation referring to CSCW and Groupware presented at the second part of this article, and the experience report regarding groupware tools application in the collaborative work for development of supporting methodology for cost calculation, developed at Feral Center of Technological Education – CEFET / RJ – Brazil and University of Minho – Portugal, in the Collaborative Work for Technological Innovation Projects discipline from the Master Degree in Technology Program of CEFET-RJ

3.1 Methodology

Four Groups were created for this experience: Group A (Brazilian and Portuguese people) and the Group B (Brazilian and Portuguese people). The Brazilian A Group is structured by 5 persons, 3 master degree pupils and 2 Scientific Initiation pupils. Firstly leaders of the Portuguese and Brazilian group worried about: collaborative environment characterization, requirements list, and technology establishment to be used during the course, besides working the synchronous interaction between individuals allocated at different places, looking for the establishment of process strong and weak points for this experiment. After definition of groupware tools, the common objective of each group was also defined. Therefore, the Brazilian A Group was responsible for the preparation of an analysis methodology of industrial costs, and the Brazilian B Group was responsible for establishment of a methodology for industrial spare parts codification, which were applied in a Portuguese Company manufacturer of refrigerated balconies.

Figure 2 shows the phases for adopted methodology during the collaborative working discipline period involving both practical and theoretical class in the Cefet/RJ laboratories, in Brazil, and those from University of Minho, in Portugal.

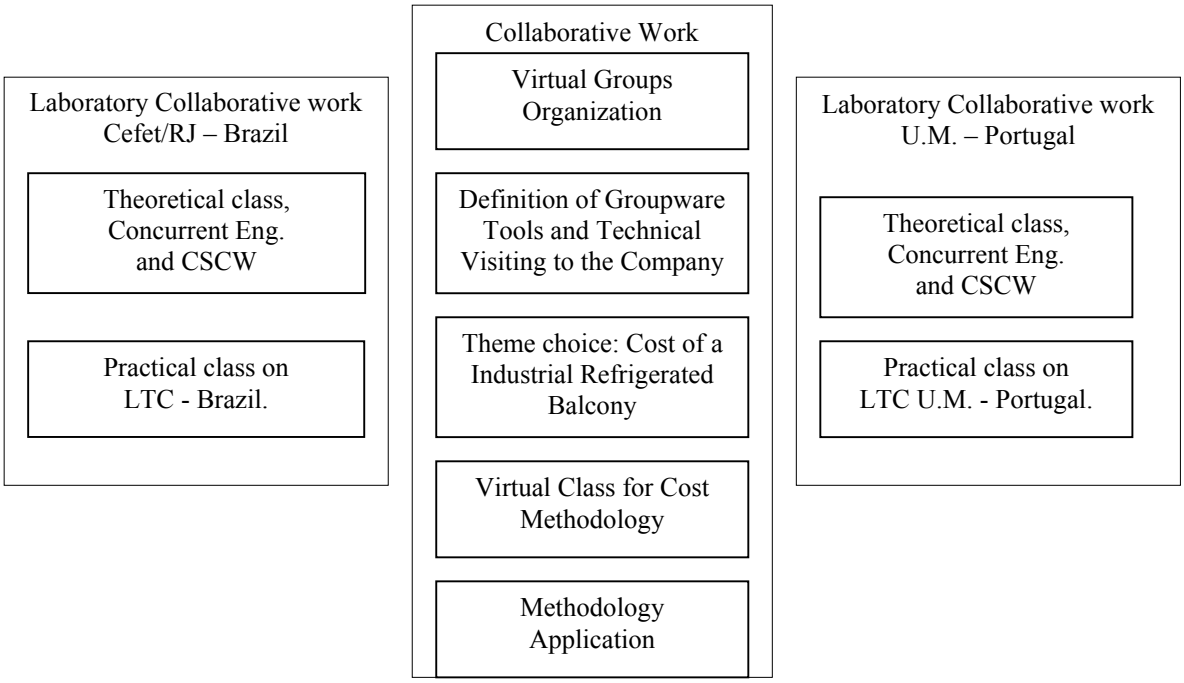

Figure 2 – Methodology of collaborative work for cost calculation to a refrigerated balconies Portuguese Industry.

The construction of the methodology was based on the approaches of Leone (1996), Snow (1981) and Ibracon (1995) and Ludícibus and Marion (2000), being defined 11 steps for the formation of a industry cost analysis: (1) Definition of the segment - product, line of products or enterprise; (2) Production of reports and enterprise's system data that make possible the identification of all costs and expenses regarding the chosen segment and that are necessary to getting the income of the chosen segment; (3) Decide for the type of cost analysis that will be used for the study, as well as the time / period taken as parameter for that (in general one year grouped by its 12 months). In the present work, for management procedures, it was adopted the variable cost or direct cost; (4) Definition of criteria to allocate the costs, for example: labor will be allocated like variable cost, electric energy used for production allocated as fixed cost and so on; (5) Creation of a spreadsheet base with the unit costs, or a standard measurement of all the costs, envolved in the production process for the product, or product line, chosen for a definite period; (6) Estimative of the standard production for a product or product line; (7) Based on spreadsheet, estimate all production costs for product or line of

products for the standard production; (8) Estimate of sale price for the product or the product line; (9) Identification of the expected incomes from chosen segment; (10) Determination the contribution part of the studied segment, taking into account both its incomes and direct variable costs; (11) Monthly budget with contribution profit and operational break-even point calculation for each sub-period (in general one month). For contribution profit and operational break-even point calculation it was used the following formula, according to Leone (1996):

$$PE = CF / (p - cv) \quad (1)$$

Where:

PE: operational break-even point.
p: price of sale for unit.
cv: changeable cost direct for unit.
(p – cv): edge of contribution for unit.
obs. The break-even point comes express in produced units, being overcome as premise sale of 100% of the production.
PE = Total Fixed Cost / (price of sale for unit - changeable cost direct for unit)

As results of this round of brainstorming meetings was prepared a students' notes for industrial costs calculation and an electronic spreadsheet in Microsoft Excel for direct application in study enterprise, in Portugal.

3.2 Colaborative Tools

For realization of this experiment synchronous and asynchronous groupware tools were used. In synchronous communication, workgroup participants were exchanging messages simultaneously through the Internet. Tools used for this modality were the Yahoo Groups (Fig. 1), MSN Messenger (Fig. 2), Yahoo Messenger (Fig. 3), Eyeball Chat (Fig. 4) and the Skype (Fig. 5).

Firstly it was predicted only the MS Messenger use, but because of CEFET-RJ server configuration, which does not allow the use of voice resource, groups were obliged to use Skype to overcome this limitation. Skype has as its main feature to be a P2P software, i.e., each machine is connected directly with another one, and there is no need of a server connection. This feature gives a better voice quality to Skype. However as disadvantage, it was noted the absence of a webcam.

In asynchronous communication, participants will act in a collaborative basis, for exchange ideas, but not at the same time. In this case, the subject in discussion does not demand an immediate solution, but it asks for proposals and opinions can be managed and stored in the system. The main tool used in groups asynchronous communication was the e-mail.

Figure 1 – Yahoo Groups

Figure 2 – MSN Messenger

Figure 3 – Yahoo Messenger

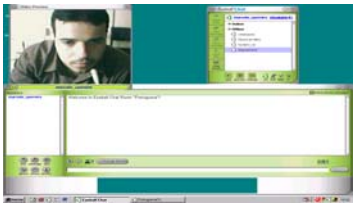

Figure 4 – Eyeball Network

Figure 5 - Skype

4. Analysis of Used Tools Functioning

The performance of the tools described in the previous section, is showed in the Table 2 by each format kind

Table 2: Groupware Tools Performance

	Audio	Video	Text
MSN Messenger	yes	x	yes
Yahoo Messenger	yes	x	yes
Skype	yes	x	x
Eyeball Chat	yes	yes	yes

Table 3 was also prepared to help in the functionality evaluation of groupware tools. It shows the performance of all groupware softwares while used in the experiment, regarding their own capabilities on file transfer, carrying out videoconferencing, chat and appointment.

Table 3: Tools Functionality Comparison.

Tools Utilization							
tools	file transfer	Videoconferencing	Chat	appointment	Total	Percent regarding the Total Points	criterion
Yahoo Messenger	2	2	3	0	7	24,1 %	0. N/A
Msn Messenger	2	2	3	0	7	24,1 %	1. regular
Yahoo groups	3	0	0	3	6	20,7 %	2. middle
Eyeball Chat	3	3	3	0	9	31,1 %	3. good
Total					29	100 %	

From the analysis of the above Table, it is possible to conclude that for videoconferencing use, the Eyeball Chat software demonstrates better performance for video, chat and sound, and was the chosen one for the experiment realization. The actually in use model, with the background and presentation of traditional offices, has fixed elevated costs as well as the need of personal collaborators presence in fixed time-tables for development of projects. In virtual models, these limitations are major reduced, making easy the cooperation and agility, enabling for quickly answer to market and customers. During work development it was observed the need of an on-line simulation software (real time) and of process managers for identification of practice difficulties, remaining this need as a limited case study. However, the methodology was carried out as its first premise and as a base point to future procedure corrections. Therefore work is just delayed for more time and will incorporate other components without information loss. All fulfilled tasks were documented and filed in virtual hard disks. Virtual job environments are ready and corrected by repeated interactions, therefore they can serve as other studies basis.

5. Conclusion

Several options were opened with CSCW research. As a research area this study englobes the most recent information technology advances and the groups needs on projects and research work. The skills, knowledges and necessary capabilities to become a participant of these groupware technologies are more and more required as minimum skills to entered in multinational enterprises which works in many places.

Innovations do not take place only in production line, but in the work process itself and on the conception of workgroup. Projects can be developed by persons at completely different places and even in different times. The virtual enterprises open the option of not only virtual workgroups but also they emphasize the need of their members know to cooperate and collaborate without the need of a chief or a supervisor by their side.

Because acquisition and maintenance of message exchanging, Internet, videoconference and other software costs become each time cheaper, more and more persons will share virtual spaces of work. This pilot work showed that this is a no return course in this contemporary work era because of the need on incorporating flexibility, agility, speed and increase of efficiency. We are living on a time of services with high fixed costs like rentals and another ones which become each time more prohibitive to a true competitiveness. Another studies must be developed to evaluate the impact over the worker of these new technologies involved in the work process, more specifically on daily work and at motivation aspects over them.

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5. Responsibility notice

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