

# A Distance Computer Supported Collaborative Learning Approach for Repatriated Teachers

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## SUMMARY

*This paper presents the design, setup and evaluation process of a pilot study that employs a computer supported collaborative learning approach. Such a pilot study was designed for open education of unemployed teaching staff from the Soviet Union in creative child-keeping and intercultural education. An especially interesting aspect consisted in the fact that collaborative and project based strategies formed both the learning methods and objectives. The experimental analysis of the pilot study demonstrated that the educational goals were achieved, since learners could successfully perform practical sessions in the Menidi playgrounds, while significant steps were made towards the creation of a community of socially excluded repatriated teachers.*

**KEYWORDS:** *Computer Supported Collaborative Learning, distance education, life-long education*

## INTRODUCTION

Information and Communications Technologies (ICT) have been extensively used in education, both in their in-class and distance versions. However, we can easily observe their adaptation to the dominant educational and social models, as e.g. in information repositories, videoconferences, practice-and-drill exercises or intelligent tutor systems. In this sense, traditional applications of ICT in education are mainly based on the role of the teacher as authority who transmits the established knowledge body to a passive class of students (Jonassen, Pek, & Wilson, 1999).

However, during the last decade several changes have occurred in both pedagogical and technological levels. This paradigm shift can be expressed in terms of focusing on the learning process of the students, who are active, relate theory and practice, learn by doing in an individual or group level, get involved in projects related to real-life, etc. A particularly interesting research and application field concerns Computer Supported Collaborative Learning (CSCL) that studies the technology (computers and networks) support to the processes of collaborative learning (Koschmann, 1996). Such a field is necessarily multidisciplinary and involves researchers and professors from engineering as well as from cognitive and social sciences.

In this paper we deal with a CSCL approach for distance and life-long education of socially excluded groups. The target group consists of repatriated professors / teachers from the former Soviet Union to Greece. Among the numerous group of repatriated people of Greek origin, we can find many female teachers with long professional experience in ex Soviet Union, who are unable

to go on with their educational activities due to cultural, language or administrative problems (Aggelidou, Amitsis and Hatzopoulos, 1998).

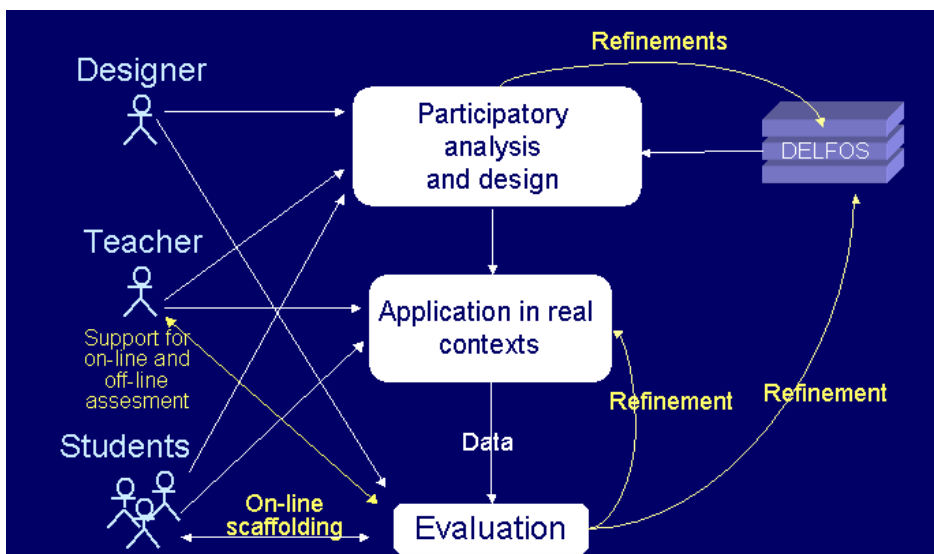
Therefore, in collaboration with the NGO (Non Governmental Organization) NOSTOS, we have chosen to study a CSCL approach to such a group with serious risks of social exclusion. The main objective was to prepare the learners (unemployed teaching staff) in creative child-keeping and intercultural education. The means to achieve such a goal consist in project-based collaborative activities via Internet, that later have to be applied to children. In this sense, we have a very interesting situation, where learners are teachers who are going to apply the same theory and method to the children, while at the same time they experience problems related to different cultures. Then, we can clearly observe an important fusion of learning objectives and methodologies.

In this paper, we present and discuss the conditions, characteristics, telematic tools and design methods that may produce a successful CSCL system. The following section describes the theoretical foundations and the conceptual framework DELFOS that guided the design of the system. Then, we can present the structure of the distance education method, as well as the specific objectives and requirements. The next section presents the setup, implementation, analysis and discussion of the pilot study. Finally, we present the concluding remarks and show the current research and development work.

## **THEORETICAL FOUNDATIONS AND DESIGN METHODOLOGY**

In the previous section we have established the context of the proposed system as well as its main objectives. We saw that we pretend to build a CSCL system that aims to be used in an open distance education setup with a target group of repatriated teachers in a situation of social exclusion. Now we can present more thoroughly the design methodology and the underlying pedagogical foundations.

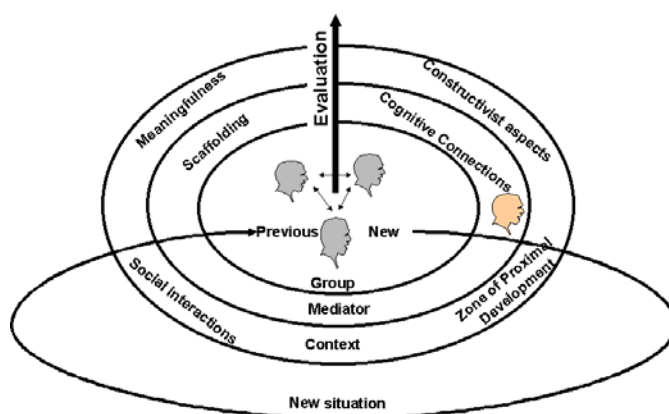
CSCL systems are difficult to be built because of its multidisciplinary nature as well as its underlying social constructivist educational model that focuses on learning processes rather on products (Dillenbourg, 1995). Therefore, conceptual frameworks are necessary that may guide the development process of a CSCL system, in their phases of design, implementation and evaluation, besides the need for general technological standards for the application of ICT in education, such as those proposed by IMS or IEEE P1484. Our work has been based on the framework DELFOS (*a Description of tele-Educational Layer-Framework Oriented to learning Situations*) (Osuna & Dimitriadis, 1999), whose life cycle is shown in figure 1, that has been successfully applied to various real CSCL environments (Osuna, Dimitriadis, & Martínez, 2001). It is oriented to CSCL systems and considers the roles of the professor (mediator), the students (learning subjects) and the designer of the CSCL system (engineers and / or professors, education specialists). One of its main elements consists in the use of participatory analysis and design, where all roles are involved. This is essential for the success of a computer supported educational system, where all actors have to build a common language and express the requirements and technological possibilities in a mutually understandable way. Also, the system has to provide on-line scaffolding for the learners, as well on-line and off-line assessment capabilities. The use of the built CSCL system has to be evaluated in real contexts, thus producing refinements to both the CSCL system and the dynamic DELFOS conceptual framework.



**Figure 1:** The life cycle of CSCL application development in DELFOS.

On the other hand, we may put emphasis on the underlying educational model that is shown in figure 2. Then, individual learning should be complemented by cooperative techniques, in which students enhance their previous knowledge taking advantage of zones of proximal development. Individual and group work with peers, as well as the support of the mediator (professor) may then allow students to construct their own knowledge in a social context. Such a work is formed around situations structured in activities, that are significative to the learners. Social interactions are essential in such an environment and should be carefully taken into account and appropriately designed. Formative evaluation of the learning process should take place based on the design objectives and the registered social interactions. At the same time, a mixed approach based on qualitative and quantitative methods should permit an evaluation of the educational research, thus enabling new actions based on the research – action principles (Martínez, Dimitriadis, et al., 2002).

Two important additional elements have to be mentioned with respect to the theoretical foundations of the proposed approach. The first one deals with the project-based method, that can incorporate several of the general aforementioned educational principles. In this case, learners are requested to look for answers to specific, complex, real-life situations, going through different phases, such as selection of topic and research method, collection of supporting evidence, structuring of results and presentation of the whole work to the rest of the groups that participated in the project. Additionally, social skills and self-esteem should be considered as essential aspects for learners that are at risk of social exclusion. Then, the whole system should take into account these factors and promote the creation of a community of learners, where they can build and enhance new social skills.



**Figure 2:** The constructivist spiral as supporting educational model of the conceptual framework DELFOS.

## STRUCTURE OF THE DISTANCE EDUCATION METHOD

In this section we present the context of the educational project, as well as various aspects, such as objectives, principles, method and technological support. Later, we can describe the pilot study and discuss the main outcomes, limitations and problems.

Regarding Greece, the target group of the project are Pontians of Greek origin who have settled in Greece from the former Soviet Union after 1989. Their population is estimated at 100,000 - 150,000 people, who have been recognised to be a socially excluded group due to economic, social, educational and institutional factors. Recent research has shown that 17.5% of repatriate Pontian Greeks from the former Soviet Union are higher education graduates and 12% of them - mostly women (primary school teachers, kindergarten teachers)- are graduates of teachers' schools. However, although most of these women teachers are professionally experienced, for reasons of formal qualifications (graduates of foreign teachers' schools are not allowed to be employed at Greek state schools) and on the grounds of social reasons (factors related to social exclusion), they cannot practice their profession in Greece. Moreover, the associated specializations in which they could be trained, making use of their previous studies and experience, are by the nature of their profession very few. One of these specializations is a relatively new (in Greece) profession, that of the animator-special educator in the fields of creative child-keeping, museum education etc. Since in recent years many primary schools have started to put related programmes in action, which also have a rich content in intercultural education in the case of schools with mixed population (local, repatriate and migrant pupils). It is estimated that there are serious employment perspectives for these specially trained educators.

The demand for "life long learning" and the growth of the telematics technology have shaped the conditions for the development of scientific research in the field of applied distance learning. An important problem that researchers now face is how to ensure in-class integration and interaction in the distance-learning environment. To this purpose, findings from the broader field of Computer Supported Collaborative Work have to be creatively applied in Collaborative Learning.

This way, the educational project aims to make several contributions with respect to the target group, i.e. to :

- Provide them an easier access to the labour market
- Help them combat their social exclusion
- Enrich their knowledge with life-long training in educational theories and methods, that can be applied in real-world schools

Then the learners, after being trained using the proposed CSCL system should be able to deal with the sector of creative child-keeping for children of age 8 to 12, that come from a different cultural environment (conditions of a multicultural or intercultural class). Thus, the learning / teaching material includes the theoretical framework that is considered to be the most convenient for such creative activities, as well as the practical applications of this theoretical framework. In this sense, the material consists of:

- The principles and framework of collaborative learning, the methods of project and learning-by-doing, as well as the approach based on experience and communication
- The theory of intercultural education
- The applications of creative child-keeping, that include or combine elements from painting, museum and theater education, environmental aspects, etc

It is then clear that the underlying principles that guide our educational project, such as learner-based process, project-based methods and collaborative techniques, as well as integration of the learner's own experience in the learning process, are coherent with the DELFOS conceptual framework, described in the previous section. Additionally, we can observe that there is a significant overlapping between the material / methods that have to be learned and the principles / methods that are employed in order to achieve this goal.

Then, the educational project was designed and developed in a pilot study according to the DELFOS framework, having in mind the following research questions:

- What are the necessary conditions that make effective the pedagogic approaches that are based on the concepts of communications and interaction in a distance life-long learning environment?
- What are the characteristics, tools and applications of telematics technology that can guarantee adequate interactions among learners and mediators, and provide conditions close to those of a real class in distance education?

A major decision was to focus learning / teaching of theory and applications of creative child-keeping on the "lesson plan" that corresponds to the "plan of creative activities", i.e. to the real application.

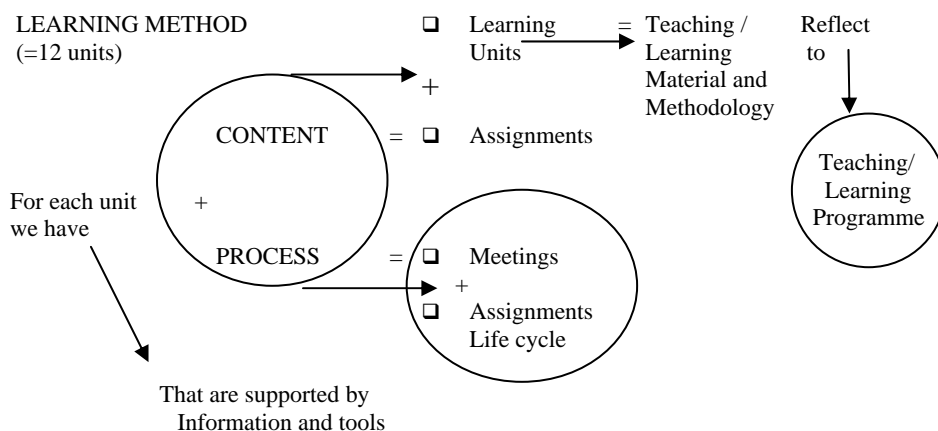
The next step in the design process was to define the structure of the learning process that consisted in the learning units, the assignments and the information material that supported the whole process. Thus the main phases were composed of:

- The meetings, that correspond to the classes of a traditional face-to-face teaching / learning. Then, the whole group of learners meet with the moderator in the virtual class, where the learners present the product of their work with respect to the

assignments and discuss them, while at the same time they plan the new meetings and decide on the new assignments.

- The process of implementation of the assignments. In this case, the learners are divided in smaller subgroups (typically of 3 members) in order to work on the common assignments that will be presented in the following group meeting.

The structure of the learning method can be summarized in figure 3.



**Figure 3:** An overview of the structure of the learning method.

The learning activities that take place during the meetings and the elaboration of the assignments are various and they are planned in a flexible way, depending on the decisions of the learners and the moderator. These activities include:

- Interchange of opinions and ideas, as well a brainstorming and production of schemes
- Interchange of information and documents
- Common view and reading of documents
- Common writing and revision of documents
- Discussions
- Storage and retrieval of documents, discussions and messages
- Decision making and voting
- Creation and access to common archives
- Access to external information repositories

The interactions that take place are multiple and include those among members of subgroups and the main group, as well as with the moderator.

All these requirements were captured using a participatory analysis and design, employing the templates provided by the DELFOS framework. Then, the technological infrastructure of the CCSL system should provide support for all these activities, namely for:

- Group meetings: Establish connections with the rest of the users in a local or wide area network, control the callers, share applications, interchange messages and documents
- Assignments procedure: Users should be able to share documents, being able to store and retrieve them in a central or local repository, in order that they can elaborate on them and present them to the rest of the class
- Decision making: Information should be structured in order to help decision making, providing for voting in case of doubts, or disagreements among the members of a group

With respect to the implementation of the tools that provide the above services, several additional requirements should be taken into account:

- Learners were not proficient in the use of ICTs, with little or null previous experience
- Significant language problems were present, with respect to the working Greek language. Additionally, because of their cultural background, use of English was prohibitive for an efficient learning process
- Technological and financial resources were very limited, due to the restricted budget assigned to the pilot study and the limited infrastructure of the NGO Nostos that assumed the support of the learners
- Limited time was assigned within the project for development of new tools, and therefore standard packages or tools created previously by the research groups should be employed

All these realistic requirements obliged us to avoid the development and deployment of sophisticated new tools, that would be more effective but at a non-acceptable cost. Then, we decided to employ standard tools such as Microsoft Netmeeting, Outlook and Office, together with facilities of IRC and browsers. The information repository for discussions and information was built around a standard portal using Microsoft Internet Information Server. Finally, the private repository for documents produced during the assignments was built using the BSCW (*Basic Support for Cooperative Work*), the Greek version of a robust, public domain tool for educational and research purposes developed by the German GMD, currently Fraunhofer Institute (GMD-FIT, 1999).

## **SETUP, RESULTS AND DISCUSSION OF THE PILOT STUDY**

Now we are able to present the concrete setup of the pilot study and discuss on the outcomes, problems and limitations.

The whole pilot study was designed according to the principles, methods and ideas presented in the previous section. The web site that integrates all material and tools can be found at <http://morgoth.islab.aueb.gr>. Then, after a study of the characteristics of the target group, 24 learners were chosen among the population of the female repatriated teachers from the former Soviet Union, that were located in different areas of the wide metropolitan region of Athens. These

students had no previous relation among them, although they had a similar background. The pilot study was conducted in two phases. In each phase, 12 students and the moderator participated in the pilot study. Each phase consisted in 10 learning units that covered aspects of pedagogical theory and 7 units related to teaching applications of the area of creative child-keeping in an intercultural environment. After the completion of the 17 learning / teaching units, the learners were invited to design and implement a creative activity, in a complete simulated environment. Such a design was performed using the same method and within a distance education environment. Finally, the designed activities were tested in real conditions at the kindergarten of Nostos at the location of Platonos, Menido. Each group of teachers performed the designed activity with 20 children of age 8 to 12 within a period of 1 hour. The group of the children was intercultural.

The practical application of the designed creative activities was evaluated as very successful, according to the evaluation criteria established previously within the DELFOS framework. We should point out that for the majority of the learners / teachers, such a practical activity was the first one that was carried out by them in contact with children in Greece, even for a short time, after several years (an average of 5 years) of occupation in different activities unrelated to their professional background.

The main result of the pilot study, as derived from both external and self-evaluation processes, consists in the **creation of an effective social space** in which the dispersed learners belonged to. The dimensions of such a social space are not solely related to the learning process itself but also to the development of self-esteem and the associated social skills. Then, teachers were related among them through the virtual space, but also contacted with each other using other channels. They considered themselves as a group that shared common experiences and goals. Additionally, they developed several social skills using the multiple techniques of collaborations. Another indicator of the success of the pilot study is the high degree of the **self-satisfaction** of the learners, as reflected in the questionnaires that were filled after the pilot study and in contrast with the equivalent questionnaires provided before the pilot study. Although the learners were conscious of the limited impact of their experience on their future professional life, they considered that they were satisfied because they finally performed educational activities, they learned new educational methods and they experienced new approaches based on actual technological environments and tools. We should specially emphasize the results of the **final practical exercise**, that was considered to be an essential indicator of the success of the pilot study.

The **use of the learning tools and the educational approach** was considered to be especially successful, as reflected in the final report of the mediator and the questionnaires. In this sense, the fact that pedagogical principles and methods coincided with the learning objective and material was considered to be successful, because of the coherence of the approach and the significance of the learning contents and methods. Additionally, the **framework of the approach allowed for multidisciplinary work**, although it was confirmed that a common language was necessary between the technology experts, the social scientists and educators. Such an obstacle was remediated using the templates of the DELFOS framework and the glossary that was created during the project. Finally, **the intercultural approach was effective** since the learners could incorporate their own experiences and background, and apply them to the group of children of the same nature. Then, the approach, tool and background allowed the expression of opinions that would be otherwise impossible, according to the report of the mediator.

Several practical problems were detected during the design and implementation phases of the pilot study. The first one reflects the instability of the Netmeeting 3.11 tool over the RTC network, as well as the problems associated with the access to Internet. Also, there were several limitations



with respect to the availability of the server that provided the Web site during week-ends and holidays, as well as the insufficient administrative support for problems associated to the Web site. Another aspect is related to the limited technological knowledge of the learners, that was partially remedied by several courses on the use of the basic tools employed in the pilot study. A significant problem was related to the lack of a structured environment that would guide the discussions as well as the preparation of the assignments. In order to resolve these problems, home-made rules were suggested to the learners for turn-taking or significant actions, such as voting procedures, common document creation, or structure of the common information repository. It is clear, that a more elaborated environment should be provided, tailored to the needs and background of learners and moderator. Finally, evaluation of the learning process was not adequately performed because of the lack of expertise of the educators in the use of qualitative evaluation tools, such as Nud\*IST In-Vivo (QSR, 1997), that allows for an efficient processing of the interaction logs and all qualitative information, such as questionnaires, observations, reports, etc.

## **CONCLUSIONS AND FUTURE WORK**

In this paper, we presented the design, implementation and evaluation of a CCSL environment destined to repatriated teachers from the former Soviet Union. In this work, the DELFOS conceptual framework was successfully employed to guide the whole process of the system development. During this process, engineers, educators and social scientists worked together in an international context in order to develop the whole system, creating a common language that allowed for a participatory analysis and design.

The educational project was based on the project method and the principles of social constructivism, that allowed for an integration of the learners experiences in a distance education environment. A significant element of the proposed system was the use of the same principles and methods in the employed approach, as well as in the learning outcomes.

The pilot study that was conducted in a time period of 3 months with two groups of 12 learners, concluded with a practical application of the designed creative activities in a real intercultural environment. The success of such a real application was positively evaluated by both learners and moderator. The most significant aspect of the pilot study was the creation of a social space where the learners could combat their social exclusion and learn new social skills. Such a conclusion is very important for the design of similar CSCL systems.

Currently, we are working in the enhancement of the designed system, according to the detected problems, in order to initiate another phase of experimental study. At the same time, a mixed evaluation approach is being employed that considers multiple sources of data, such as interaction logs, questionnaires, observations, etc.

## **ACKNOWLEDGMENTS**

The authors would like to acknowledge the contribution of all partners of the project "Distance collaborative learning of unemployed teaching staff from the Soviet Union in creative child-keeping and intercultural education" financed by the Leonardo da Vinci programme of the European Union (EL/98/I/68108/PI/1.1.1.e/FPC), i.e. Athens University of Economics and Business (GR), Marasleion Didaskaleion (GR), Hessischen landsinstitut fur Paedagogic (DE), EKPESTO-NOSTOS (GR), University of Valladolid (ES), GGAE, Ministry of Foreign Affairs (GR). Special thanks to Dr. G. Nikolaou (Marasleion, presently at Univ. of Ioannina), C. Osuna (Univ. of Valladolid, presently at Univ. Autónoma de Guadalajara, México), W. Roehrig (HILF), G. Moustakas (GGAE), A. Xatzopoulos and S. Aggelidou (Nostos), A. Kefala and I. Mamalis

(AUEB), as well as to the learners / repatriated teachers who made possible this project. Partial financial support for this research project was also given by the GGAE, Ministry of Foreign Affairs, Greece, the Autonomous Region of Castilla and León, Spain (VA18/99, VA117/01), and the Ministry of Science and Technology, Spain (TIC2000-1054).

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