Continual Education of Teachers on ICTs in Education through e-Learning Community Activities. A *Pilot Study*.

Tharrenos Bratitsis
Electrical Engineer–Computer Scientist,
Postgraduate Student,
University of the Aegean, Rhodes, Greece
bratitsis@aegean.gr

George Henry Hlapanis
Informatics Teacher, Computer Scientist,
Postgraduate Student,
University of the Aegean, Rhodes, Greece
hlapanis@aegean.gr

Angelique Dimitracopoulou
Associate Professor, Learning Technology
and Educational Engineering Laboratory
University of the Aegean, Rhodes, Greece
adimitr@aegean.gr

Abstract

A *Distance Learning Continual Education* program was implemented by the Laboratory of Learning Technology and Educational Engineering of the University of the Aegean. It could be described as a learning environment concerning ICT issues, based upon Adult Collaborative Learning and Learning Community principles. Within this *e-Learning Community*, in-service teachers were able to exchange ideas and educational scenarios, consult experts, thus resolving questions and get informed about pedagogical, technological and other issues.

Within this paper the educational activities of the research project are presented. Moreover, some first results arising from the current pilot period of operation, such as trainees' behavior-patterns, learning outcomes and some usability reports are also presented.

Keywords: *e-Learning Community, In Service Teacher Education*

Introduction

Perpetual changes in various social sectors consequently affect educational systems throughout the world. Thus educators need constant updating of their cognitive supplies. In countries, such as Greece, geographical morphology obstructs wide range continual education efforts. On the other hand, network technologies, especially Internet propagation, provide the means to overcome such obstacles implementing *Distance Learning Educational* programs. A great number of platforms are now available [1] through which the implementation of different kinds of *Distance Learning* programs has become possible. There is a plethora of such programs, concerning teacher education in particular, varying along a number of dimensions. They can be characterized as simple *On-line Courses* or *Learning Communities* [2], or *Communities of Practice* [3]. They can be tight-knit and small or loosely connected and large [4]. They can be self-administrated [4], allowing members of the community to decide aspects of the course, or tightly organized with a completely fixed schedule [5], [6]. They can be completely based on electronic means [4][6] or using, to some extent, face to face meetings [5], [7]. They can be concerning pre-service [6] or out-of-service or in-service teachers [5], or even all kinds of teachers [7].

The implementation of a *Distance Learning Educational* program is now attempted by the Laboratory of *Learning Technology and Educational Engineering* of the University of the Aegean. It could be described as an *e-Learning Community* based upon *Adult Collaborative Learning* and

Learning Community principles [2], providing continual assistance to each member mostly on *ICT* issues and the *use of ICTs in Education*. Members of the community are in-service teachers of primary and secondary education and the project could be considered as a transitional phase between more formal educational efforts organized by the Greek Ministry of Education. The *Distance Learning Educational Environment* that has been built could serve educational needs on a continual basis and also could be easily transformed into a means to provide more formal on-line courses.

Pedagogical Approach

Nowadays, there is an increasing effort to design *systems* providing such *Distance Learning Educational* programs, based on currently established theory and research in human learning [9]. Consequently, recent theories derived from the socio-constructivism paradigm, such as **Distributed Cognition theory** [10], [12] or **Activity theory** [11] have started to influence requirements on such *Educational programs*. In fact, there is a paradigm shift from teacher directed instruction to learner management learning, from subject centered design to learning-centered design, from individualistic learning to learning communities. Most importantly, there is a shift from a vision of students as more or less passive learners to students as apprentice knowledge workers.

Our *Continual Education* model is consistent with the above mentioned modern learning theories, but also consists of three basic parameters often encountered within *e-Learning Communities* [2], [13]. These are *Knowledge*, *Social Interaction* and *Identity*. *Knowledge* can be acquired through the evolvement of scientific cogitation (which is achieved by supporting active, exploratory and experimental approach) through individual or team assignments, research and evaluation of available tools, construction, experimentation and visualization of ideas, through the acquisition of meta-cognitive skills (skills that control the use of obtained knowledge and construct the ground for cognitive processing), such as the ability of reflection, of information analysis, searching and navigation strategies (for the web, databases), etc. *Social Interaction* is achieved by team projects, which lead members of the community to mutually contribute to the knowledge being built within the community. *Identity* relates to the existence of political and critical expression within the community; also the building of uniquely identifiable knowledge contribution by individuals, by introspection and reflection of the acquired knowledge.

Finally our model is based on the consideration that e-learning can be accomplished through numerous online collaboration activities, given the appropriate educational resources and communication services. The content of each lesson can be dynamically and radically changed

according to the students' needs and the progress of the activities assigned. During each lesson there is a contribution to the mutual knowledge base from every party (teachers, students, even guests).

Pilot Case Study of Implementation – Aims of Research

While intending to test our theoretical assumptions and study the functionality of the system, as well as the effectiveness of the Educational Model, we initiated a case study involving elementary and secondary level in-service teachers. We implemented only a fraction of all possible services, in order to achieve basic on-line and off-line communication (e-mail, chat, fora), automated announcement service, useful document categorization to enhance browsing, document sharing and authoring services in order to facilitate content contribution. Our System's Architecture is based on Microsoft's *SharePoint™ Portal Server 2001 (SPS)*. This is a software platform which extends the capabilities of *Windows* and common *Office* applications, by providing a powerful new way to organize, find, and share information through full system integration with other server platforms (such as *SQL* and *Exchange Server*) [14].

The main research issues that initiated this effort are to study the operation of an *e-Learning Community* constituted by teachers, the administrative tasks required by such a system's moderation along with the implicated population's learning behavior within a collaborative environment, and issues concerning the development and evaluation of a *Virtual Learning Environment*, based on existing unexploited technologies in combination with advanced content management software.

The Learning Community's Activities

The project started on 1/4/2003 and lasted until 30/6/2003, a total of 90 days. It was divided into five discrete phases:

1. Acceptation (15 Days)
2. Setting up (23 Days)
3. Intensive Communication (11 Days)
4. Group Assignments (31 Days)
5. Assessment (10 Days)

Acceptation Phase: The description of our learning targets and the determination of the basic rules specifying our learning community took place during this phase. Our pedagogical approach, as previously described, became known. Only a time schedule concerning some basic assignments was predetermined while the course of the community's activities was intended to be co-decided by all

participants. Over 50 schoolteachers filled in application forms, and 40 schoolteachers were accepted for the next phase.

Setting up: During this phase all basic installation of software and hardware that was required in order for the schoolteachers to continue, was accomplished. This was done through the assignment of three different tasks, all designed for individual accomplishment and the acquisition of some technically oriented meta-cognitive skills. About 10 participants were unable to overcome certain technical problems that arose, although a lot of help was provided. A total of 15 (approximately) resigned during this phase due to the above-mentioned technical difficulties and the time demands of the Learning Community. The remaining members (62.5% participation) accomplished fairly well the assigned tasks. Communication via email was initiated during this phase, thus initiating social interaction procedures. The Community's Web Page was initialized.

Intensive Communication: Different *Fora* were initialized, chat was provided, and all three tasks assigned during this phase were related to boosting the interaction within the Community, the exchange of information, the participation in each forum and each chat that was organized. Political and critical expression took place, reflection and social interaction as well.

Group Assignments: The schoolteachers were in position to determine the course of the project, the nature and the targets of the next assignments. Five groups of participants were defined by the community in order to accomplish the first group assignment. This was decided to be the collection of useful educational ICT material such us educational software, useful educational URLs, articles, examples of effective ICT methods of teaching, etc. Each group had to select material according to their specific needs, taking into account eventual collaboration and possibly future materialization of team teaching based on ICT. A presentation and argument about each team's selection of material took place in an open discussion. Three out of the five groups performed adequately well and one group remained indifferent. Within the fifth group disagreements appeared, which at some point became so intense that drastic measures were enforced by the moderators leading to a regrouping of some members. On the whole, results deriving from the first group assignment were considered quite satisfactory and all educational material collected were embodied in a mutual data base which was added to the knowledge base of the community in the website. During the implementation of this group activity, scientific cogitation, social interaction, reflection and finally the building of a mutual Knowledge Base took place.

Later on the participants decided about the second group assignment. For this, three groups of participants were defined. This assignment was going a step further from just a collection of useful educational material. A differentiation between the groups occurred. The first group was responsible

for the assessment of the collected material. The assessment was based on certain predetermined criteria. The second group was responsible for the construction of an effective database with queries and search capabilities. Finally, the third group consisted of those who encountered difficulties at the time (mostly due to time constraints) and had less demanding assignments such as enhancing the website of the community, assisting and participating also in the other groups but with less work overload. A third group assignment initially programmed was finally not implemented due to further decrease of active participants (by mid June participation was down to 45%) increasing time constraints and complications deriving from the parallel late-June examination phase of all schools of secondary education.

Assessment: An internal evaluation of the project was attempted during this phase. The assessment (self assessment of participants, evaluation of moderators and project) was finally completed by 12 participants (30%).

During the above mentioned phases participation varied from 62.5% down to 30%. Nevertheless participation can be considered 40% - 45% for the greater part of the project (80 out of 90 days).

Problems encountered

Any efforts as complicated as the accomplishment of an eLearning Community is due to face certain problems. We categorized the problems encountered into three basic categories, namely *technical*, *behavioral* and *moderation related*.

Technical problems: (a) Several problems arose by the fact that some of the end user computer systems were superannuated, in matters of hardware, as well as software. (b) Moreover several of the participants were technically incompetent and feared greatly any, even the slightest, interfering with their systems. This led the coordinators to a number of on site visits, apart from the great amount of help provided by other means (e-mail, telephone, etc) and in some cases this was not enough. A derived conclusion is that some teachers that consider themselves technically competent are in fact overconfident about their skills and tested in practice their incompetence is revealed. (c) Also many technical problems arose due to software incompatibilities, regarding the core of our system (*SPS*), demanding a great amount of effort in order for them to be solved. Our first approach was to implement services as simply as possible. The problems we encountered revealed that end users want to have no interference at all with system adjustment, if possible. They are reluctant to adjust several system options, even if they are carefully guided to do so. This fact enforced one of our research issues, which was the building of a system that needs minimum interaction with the end user while setting up course participation.

Behavioral problems: Although the participants were informed about the nature of the Learning Community we were building, some did not behave in an appropriate manner. In general there was a certain difficulty in cooperating with fellow members that belonged in the same group. This was mostly due to lack of experience in remote cooperation, to the existence of an antagonistic behavior by many participants, to the existence of reservations in sharing knowledge and work. Yet most participants behaved as anticipated, quite well, with a spirit of cooperation and only about 5% of the participants did in fact cause some serious problems with their behavior. The problematic behaviors can be categorized in two main categories: (a) related to cooperation, difficulty in working as a member of a team, and (b) reluctance in sharing the acquired knowledge, in individually contributing in the mutual Knowledge Base of the community.

Problems related to moderation: (a) Both behavioral and some technical problems that arose, support for the argument of a face to face introductory phase that should have taken place at the beginning of the project. During such a phase, certain technical difficulties could have been overcome and some aspects of group working and distance learning could have been presented and problems related to those dealt with. If such a phase had taken place, the results could have been even better, as applied in [5], [7], [8]. (b) Some moderation choices that were proved to be less effective than anticipated. For example nearly all communication was mostly linked to one or both moderators. There was usually an immediate answer by one or both moderators to questions, thus maybe deactivating in a sense the interconnection between participants and making them used to getting answers by the moderators. This had a great cost in group activities. (c) The time setting was unfortunately chosen due to the conflict that arose with some extremely demanding school activities, such as the secondary education final exams of June. (d) Finally, had the project incorporated a number of definite courses, thus being an on-line course as well as a self-administrated learning community providing continual assistance to members (a kind of a mixed model), some of the encountered problems might have been decreased (although probably not diminished). This could have been achieved as a result of the presence of influential and important professors, as well as the existence of a more concrete motivation, except of course of the experience and the knowledge obtained. The latter obviously prevented some participants to continue investing their effort and time in the project.

All the above mentioned problems that occurred were confirmed by the results of the internal assessment phase of the project.

Positive Results

Nearly all participants considered their participation as an overall positive experience. They consider such efforts worth continuing, they would participate again if a follow-up took place and they had the opportunity; thus leading us to the conclusion that a *continual education* approach with this model is feasible. Yet of course that was the opinion of those that stayed on the project till the end (30-40% of the initial number of participants). Unfortunately it was not possible to take into consideration all views, even of those that did not stay till the end.

Knowledge was acquired by the participants, to a different extent of course for each one. Especially through the cognitive and meta-cognitive skills that were developed, such as the ability to use ICT tools that are available, the ability of reflection, of information analysis, skills related to searching and navigation strategies (for the web, databases), etc. Knowledge was also acquired through the activities of searching and discovering and through social interaction, especially with more experienced colleagues as well as with peers.

The building of a Knowledge Base through uniquely identifiable knowledge contribution by each individual was also a major element of the project. The choice of assignments, covering many different aspects of ICT, was quite tempting. Issues of simple but essential technical settings, of pedagogical nature, matters of judgment and assessment of ICT tools were also handled in the course, opening new horizons to those who participated. The participation and outcome in all individual assignments and in one of the two group assignments were great. Some participants even stated that this project has helped them decide some new approaches in their own teaching.

Discussion

The *Distance Learning Educational* program that was implemented by the Laboratory of Learning Technology and Educational Engineering of the University of the Aegean can be described as a learning environment concerning ICT issues, based upon Adult Collaborative Learning and Learning Community principles. The overall planning concerned a self-administrated *e-Learning Community,* within which teachers would able to exchange ideas and educational scenarios, consult experts, thus resolving questions and be further trained about pedagogical, technological and other issues.

The first results arising from the current pilot period of operation were positive in general, although several problems were encountered during the implementation of the project. These were related to technical aspects, to the behavior of the participants and also to the chosen moderation policy.

Several conclusions can be drawn from the examination of these problems. Technically, more work needs to be done in matters of on line communication methods and tools, due to the importance

of this facility to the operation of such a community. Simpler, more user-transparent and user-friendly implementations are necessary. Moderation and behavior problems would have been avoided by using a tighter schedule, enriched with stricter teaching courses. Thus our assumption that a lot of research is needed in matters of moderating *e-Learning Communities* planned for resource repositories rather than tutoring organizations.

Positive results were the knowledge that was acquired by the participants, the mutual building of a Knowledge Base, the satisfactory participation (for at least 4 out of the 5 phases) and most of all, the derived conclusion that a *continual education* approach with this model is feasible.

Bibliography

1. Wegner, E. (2001). "Supporting Communities of Practice." A Research and Consulting Report.
2. Palloff, R.M. & Pratt, K. (1999). "Building Learning Communities in Cyberspace: Effective strategies for the online classroom." Jossey-Bass Publishers, San Francisco.
3. Wegner, E. (1998). "Communities of Practice: Learning, Meaning and Identity." Cambridge University Press.
4. Rogers, Jim (2000). "Communities of Practice: A framework for fostering coherence in virtual learning communities." *Educational Technology & Society 3(3) 2000.*
5. Manca, S. & Persico, D. & Sarti, L. (2003). "On Student Teachers' Attitudes Towards Online Learning". In proceedings of the IASTED International Conference, Rhodes, Greece, 121-126.
6. Vonderwell, S. (2003). "An examination of asynchronous communication experiences and perspectives of students in an online course: a case study." The Internet and Higher Education. Volume 6, Issue 1, 2003, 77-90.
7. Nilsen, A. & Almås, A. (2003). "Teaching Net Based In-Service Courses". In proceedings of the IASTED International Conference, Rhodes, Greece, 115-120.
8. Kenski, M. (2002). "Distance learning. A teacher on the road." European Conference on Educational Research, University of Lisbon, 11-14 September 2002.
9. Jonassen, D. & Land, S. (2000). "Theoretical foundations of Learning Environments". LEA, NJ.
10. Salomon, G. (1995). "Distributed Cognitions: Psychological and educational considerations." Cambridge, England: Cambridge University Press.
11. Engestrom, Y. (1987). "Learning by expanding: An activity theoretical approach to developmental research." Helsinki, Finland: Orienta Konsultit Oy.
12. Pea, R. (1995). "Practices of distributed intelligence and designs for education. Distributed cognitions: Psychological and educational considerations." Cambridge, England: Cambridge University Press, 47-87.
13. Lemke, J. (1993). "Education, Cyberspace and Change". The Arachnet Electronic Journal on Virtual Culture, vol.1, no1.
14. Bratitsis, T. & Hlapanis, G.& Dimitracopoulou, A., (2003). "Advanced Distance Learning Systems. A technical approach using MS SharePointTM Portal Server." In proceedings of the IASTED International Conference, Greece, .489-494.