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A Course Model implemented in a Teacher's Learning Community Context: Issues of course assessment

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Abstract. How could we design Course programs in a Teachers' Learning Community context? Is it possible to conceive a concrete and appropriate course model? And if so, how could we assess the effectiveness of such a course-model in a so complex learning situation? In this paper, a model implementation of technology-based courses is presented. The model was specified according to Adult Collaborative Learning principles and was implemented in a Learning Community context. This model was put into practice during a Distance Learning Educational program, concerning further education of in-service primary and secondary education teachers. The program was named *'School-Teacher's Learning Community'* and hosted many different web-based supported courses. Within this broad *e-Learning Community* students were educated, via the internet, on aspects mainly concerning uses of Information and Communication Technologies (ICT) in their teaching practices. The application of the previously specified course model was pursued, yet instructors responsible for each course were given substantial independence and the degree of harmonization with the course model was up to them. Some aspects of the case study, which was conducted within the context of this educational program, are also presented. Emphasis was given to correlations that are derived from the analysis of data related to the research question concerning '*the extent of successful results that the application of the specified course model produced*'. Course assessment issues were dealt with and evaluation of positive results was accomplished through the measurement of the degree of satisfaction of certain criteria that were considered decisive. Finally, conclusions, benefits and perspectives of issues presented in the paper are also presented.

Keywords: Teacher Education, Course Model, Learning Communities, ICT, Course Assessment.

1 Introduction

Nowadays, an increasing interest in educational systems implemented with the use of Information and Communication Technologies (ICT), exists. Such systems are mostly implemented over the web, yet unfortunately only some are designed according to established theory and research in human learning.
Most existing cases come from the academe (Murphy *et al.* 2000, Merryfield 2001, Kenski 2002 , Guimera *et al*. 2002, Hudson *et al.* 2003, Gaskell 2003, Kotiranta *et al.* 2003, Martýnez *et al*. 2003, DePaula 2003, Groth 2003, McArthur & Bruza 2003, Barrett 2003, Tisdell *et al.* 2004, Taurisson & Tchounikine 2004, Salmon & Jones 2004, Vlachopoulos & McAleese 2004, etc.) and only few from the circles of primary and secondary education (Ferry *et al.* 1999, Rogers 2000, Dawson *et al.* 2000, Barab *et al.* 2002, Bradshaw *et al.* 2002, Vonderwell 2003 , Nurmela *et al.* 2003, Reffay & Chanier 2003, etc.), while even fewer concern further education for in-service teachers (Friel 2000, Riding 2001, Jung 2001, Andrews 2002, Wu *et al.* 2003, Nilsen & Almas 2003, Manca *et al.* 2003, etc.).
Some traditionally designed cases implement formal courses in a manner similar to educational programs conducted face to face (Ferry *et al.* 1999, Merryfield 2001, Jung 2001, Wu *et al.* 2003, Nilsen & Almas 2003)
Other cases are designed so as to host or create *Learning Communities* via collaborative environments, usually called *Communities of Practice*, within which *learning* can be accomplished (Rogers 2000, Barab

et al. 2002, Guimera *et al*. 2002, Hudson *et al.* 2003, Gaskell 2003, DePaula 2003, McDonald 2003, Groth 2003, McArthur & Bruza 2003, Tyler *et al*. 2003, etc.).
Finally, only few cases have suggested formal course implementation within a framework of development and maintenance of an online community of learners (Murphy *et al.* 2000, Barrett 2003, Vonderwell 2003, Tisdell *et al.* 2004).
According to Hyo-Jeong *et.al.* (2005), there seems to be a certain lack of instructional guidelines specifically developed for collaborative learning. In cases that are designed for formal electronically supported courses, usually no rules or any special guidelines are followed.
On the other hand, in cases that Learning Communities are implemented, there may be positive learning results derived by the collaborative context and the interaction of the Community members, yet learning is informal and usually without predefined goals.

How could we design Course programs in a Teachers' Learning Community context? Is it possible to conceive a concrete and appropriate course model, which is needed to define and propose when we have a number of tutors to be involved? And if so, how could we assess the effectiveness of such a course-model in a so complex learning situation? The present paper deals with these three questions. In fact it describes a concept for conducting online courses; the concept is specific with regard to the way online courses are implemented. A course model is presented, including a Web-based environment with specific artifacts, a Lesson Structure and a number of Rules to be followed by the Community members.
A central challenge for courses implemented in a broader *Learning Community* context would be to exploit the advantages and potential of an informal collaborative learning environment and in this paper it is argued that this could be the case if courses are implemented according to a specific intentionally designed model.
In the case study concerning this implementation that was conducted, issues regarding course evaluation were taken into consideration. Matters of assessment of the leaning results are rarely considered in cases of Learning Communities in general and especially in cases such as the one presented in the paper where blended learning solutions are attempted. Some key research results of the case study are also presented in this paper.

2 Theoretical Framework

A paradigm shift from teacher directed instruction to learner management learning, from subject-centered design to learning-centered design, from individualistic learning to learning within a social context, has occurred in the research area of learning theories especially during the last few decades. Most importantly, there is a shift from a vision of students as more or less passive learners to students as apprentice knowledge workers (Jonassen & Land, 2000).
Learning theories with a social dimension, such as Vygotsky's 'Social Development Theory' (1962, 1978), Mead's 'Symbolic Interactionism' (1934) and Dewey's 'Pragmatism' (1911/1978) which had been forgotten for many years, are now influencing nearly all learning theories, modern as well as traditional ones.
In fact most modern learning theories have a 'Socio-Constructivist' nature (Wertsch 1979, Rogoff 1990, Dillenbourg 1995), thus they have a 'Constructivist' core, yet they have been greatly influenced by the above mentioned social-oriented learning theories. Such a 'Socio-Constructivist' approach of the concept of learning can be noticed in 'Collaborative Learning' (Dillenbourg et al. 1996), in 'Sociological Paradigms' (Burrell & Morgan 1979), in 'Psychological Theories of Group Interaction and Performance' (McDonald 2002), etc.

2.1 Learning Communities

"Learning Communities" are created in many ways and for many different reasons. Learning Community requirements and implementation are influenced by recent theories derived from the socio-constructivism

paradigm, such as 'Situated Learning' theory (Lave and Wenger 1990), 'Activity Theory' (Leont'ev 1974, Luria 1974, Vygotsky 1978, Kuuti 1996), or 'Distributed Cognition' theory (Hutchins 1991, Salomon 1993, Pea 1995). According to Barab (et al., 2001), an online community can be defined as '*a persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise*'. According to Rovai, (2001), participation in a Community generates a substantial increase in useful information access, by the use of the "Community's Knowledge Base" and mutual support, commitment and mostly cooperation among the participants is endorsed. The process of creating a Community is regarded as bearing mutual commitment, rules that determine the way participants interact, reliability, negotiation, understanding and finally knowledge acquisition through the creation of practices within the Community (Wenger 1998). Especially "Communities of Practice" are considered by many researchers (McMillan & Chavis 1986, Palloff & Pratt 1999), as potentially useful environments for both students and instructors. According to Johnson and Johnson (1987), a student's participation in a Learning Community can develop the student's ability to learn on his/her own, beyond the limits of the educational environment. In general it is considered that e-learning can be accomplished through numerous online collaboration activities, given the appropriate educational resources and communication services. In e-learning, the course content can be dynamically and radically changed according to the students' needs and the progress of the activities assigned, thus facilitating the process of learning.

2.2 Parameters of the proposed course implementation model

All of the above were taken into account, influencing the design of the course implementation model, thus three basic parameters, according to the model, should be included in every e-supported course. These parameters are "*knowledge acquisition*", "*social interaction*" and "*expression of identity*" which are also in accordance to *Adult Learning* principles (Knowles 1984, Jarvis 1985). *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 and co-reflection, of information analysis, searching and navigation strategies (for the web, databases), etc. *Social interaction* is achieved through team building activities and the assignment of projects that recquire collaboration, which lead members of the community to contribute mutually to the *knowledge* that is being built within the community. *Expression* of *identity* relates to the existence of critical expression within the community; also the building of uniquely identifiable knowledge contribution by individuals, by introspection and reflection of the acquired knowledge. According to the model, the above mentioned parameters should be applied to and should influence all aspects of the electronically supported course, such as the available artifacts, the means of communication, the methods of interaction, the course structure, the moderation involved, even the use of educational material (Bratitsis *et al.* 2003).

3 The implementation of the course model within an e-Learning Community context

This electronically supported course model was put into practice within an *e-Learning Community* context during a *Distance Learning Educational* program. The program concerned further education of in-service primary and secondary education teachers and was named *'School-Teacher's Learning Community' (STLC)*. Fifty nine (59) in-service teachers, working in a dispersed area (different islands) of the Aegean Sea in Greece participated in the program as members of the Learning Community. At the same time they could participate as *Students* in a number of different electronically supported courses that were conducted in a formal manner and were implemented according to the proposed course-conduction model to a certain extent. The content concentrated on aspects mainly concerning the use of Information and Communication Technologies (ICT) in teaching practices. There were eighteen (18) different electronically supported courses that were moderated by 23 *Instructors*, who were also considered members of the Learning

Community and could participate in every Community Activity. The instructors participated from great distances all over Greece. The students were allowed to participate to several different courses, up to 5. Finally, the overall Learning Community was moderated and supervised by 2 *E-Moderators*. These e-moderators had properly informed the instructors about the Learning Community function prior to the inception of the program. The use of the previously specified course model was pursued, yet instructors responsible for each course were given substantial independence and the degree of harmonization of the course implementation with the model, was up to them.

TTable 1: Information concerning the 18 courses of the *School-Teacher's Learning Community*.

Subject/Content concerning:	Course code	Course Title	No of instructors participating	Duration in weeks	No of students that attended	Completed
All teachers of secondary and primary education	GEN1	Using *ICTs* in a Classroom	1	4	14	YES
	GEN2	Projects of collaboration using the Internet	1	5	12	YES
	GEN3	Learning Processes	1	4	13	NO
	GEN4	Cyberspace and school Mathematics	1	6	12	YES
Literature Teachers	PHIL1	*ICT* tools assisting the understanding of complex history content	1	7	8	YES
Mathematics Teachers	MATH1	The use of *Cabri Geometry* software in order to assist geometrical concepts learning	1	9	12	YES
	MATH2	Putting into practice 'Mathematics'	2	5	11	YES
	MATH4	Education findings	2	6	12	YES
Science Teachers	PHYS1	Using simulations to support learning in Physics (the *Interactive Physics* software)	1	5	10	YES
	PHYS2	Using *Gaia* software in order to conceive learning activities & students 'activities' sheets	1	6	9	YES
	PHYS3	The use of *Modellus* software	1	8	12	YES
	PHYS4	Using school physics labs and software in order to teach mechanics	1	3	7	NO
	PHYS6	*ICT* tools assisting the learning of complex concepts in physics	1	4	7	YES
Informatics Teachers	PL1	Concepts of Information Technology *Education*	8	16	9	YES
	PL2	Teaching about multimedia in secondary education	1	3	8	NO
	PL3	Teaching Programming concepts with the use of *DELYS* software	1	4	8	YES
	PL5	Educational software assisting the understanding of programming concepts	2	5	16	YES
	PL6	Computer Science Educational Concepts: methods and findings	1	2	7	YES

As seen in Table 1, within the "School-Teacher's Learning Community" 18 formal courses were implemented, yet 3 were not completed due to problems that arose during the conduction. The number of students attending each course varied from 7 to 16, with a mean of 10.4 per course. The duration of each course varied from 3 to 12 weeks, and the average duration was 4.8 weeks. In the above table (Table 1), information concerning each course is presented, from left to right: the course category, the code of the course, the title, the number of instructors that participated, the duration of the course in weeks, the number of students that attended and whether the course was completed or not.

In the following sections, the general features of Learning Community functioning as well as the artifacts used in the Learning Community as a whole are presented. Also, the features of each course are presented in more concrete terms: in particular, the artifacts used for each course, the Course Structure, and the Rules and methods to be followed by teachers and/or students, as well as the modes of e-moderation.

3.1 Features of the Learning Community functioning

As previously mentioned the overall 'STLC' Learning Community consisted of 84 members: 59 in-service secondary education teachers as students, 23 instructors and 2 e-moderators. Main learning goals of the Community were the exploitation of ICT in everyday practice at school and the use of ICT for teaching purposes. In parallel, important goals were also the sharing of any such previous experience of ICT among the members, the reflection on the difficulties to implement innovative ICT applications in current school conditions and how to confront them, as well as the formation of workgroups of school teachers that would or could cooperate virtually and/or face to face (when they lived in the same islands), dealing with the isolation that exists in the distant (away from mainland Greece) small islands of the Dodecanese, etc.
At the initial stages of the Community implementation a few face to face seminars were held in the most populous islands of the program, during which more than half of the Community members participated and met each other, thus creating some social bonds.
E-moderators tried then to enhance these bonds, by creating a friendly and collaborative environment. In fact, three types of asynchronous discussions via fora were being moderated: (i) Discussions involving the whole community, (ii) Discussions involving members of a category of courses of the same nature (e.g. all Mathematics' teachers), (iii) Discussions involving the members participating in each specific course.
Discussions concerning the whole of the Community were triggered by members that participated in formal lessons that were conducted in a parallel manner to the Community's function, as previously mentioned. Experiences and ideas coming from these formal lessons were also shared among participants.
Activities such as joint projects or face to face assemblies of subgroups at each island were also encouraged by the e-moderators and were applied. Additionally, assistance on technical matters was provided on a continuous basis by e-moderators, instructors and fellow members.
Self assessment and community assessment was permanently pursued, through discussion, reflection and cogitation, by asking Community members to answer specific questions and questionnaires, etc.
In fact, the intention of this Learning Community was that members would acquire *knowledge* both from formally planned learning scenarios, as well as through informal exchange with fellow learners, professors, or experts.
Summarising, in order to create and sustain the Learning Community, independently of the specific courses, the following principles were applied: (a) an hybrid virtual and face to face mode was implemented, (b) Students were constantly encouraged to be involved in different groups and to shift their participation from small groups (e.g. groups working on a specific learning activity) to wider groups (the members of a specific course) or sub-communities (e.g. all Mathematics' teachers), or to the whole community (all the members of STLC), (c) Fellow members were encouraged in assisting new coming members (in technical matters or even in more 'theoretical ones'), (d) Discussions concerning the whole community (and sub-communities) where permanently sustained by the e-moderators, so as to continuously support the sense of the community. Through these discussions the "*expression of identity*" feature was mostly 'applied'. All members of the Community were needed to work for the support of the *Learning* Community while at the same time they had to work independently for the specific courses they participated in. (e) Each instructor was involved in the permanent effort to create a cooperative and collaborative work mode, etc.

3.2 Artifacts used in the Learning Community

In order to endorse "*social interaction"* and "*expression of identity"*, as well as to reflect and represent *knowledge acquisition* within the frame of the Learning Community as a whole , as well as each *course implementation,* several artifacts were designed and used so as to support open communication on a continual basis as well as cooperation and interaction among the participants.
The Community's Learning Space was a virtual area, a web-based environment with specific functionalities, where all information concerning the Community and information concerning each separate course was placed or uploaded by members and could be retrieved. Access was under control, by means of security artifacts, in order to allow privacy within the Learning Community.

The Community's Learning Space Platform was developed with "Microsoft Sharepoint™ Portal Server" (SPS). An instance of the central webpage of the Learning Community's platform is presented in Figure 1. The platform hosted as many different means of communication, as budget restrictions allowed, namely Fora (a central forum for the whole community, and one for each course category, for example Mathematics Education with ICTs and one for each specific course), a few chat services and of course email accounts and services. Bulletin boards, services supporting the writing of documents by multiple authors, advanced security services, automatic notification services and advanced search services were also available to all members of the Learning Community.

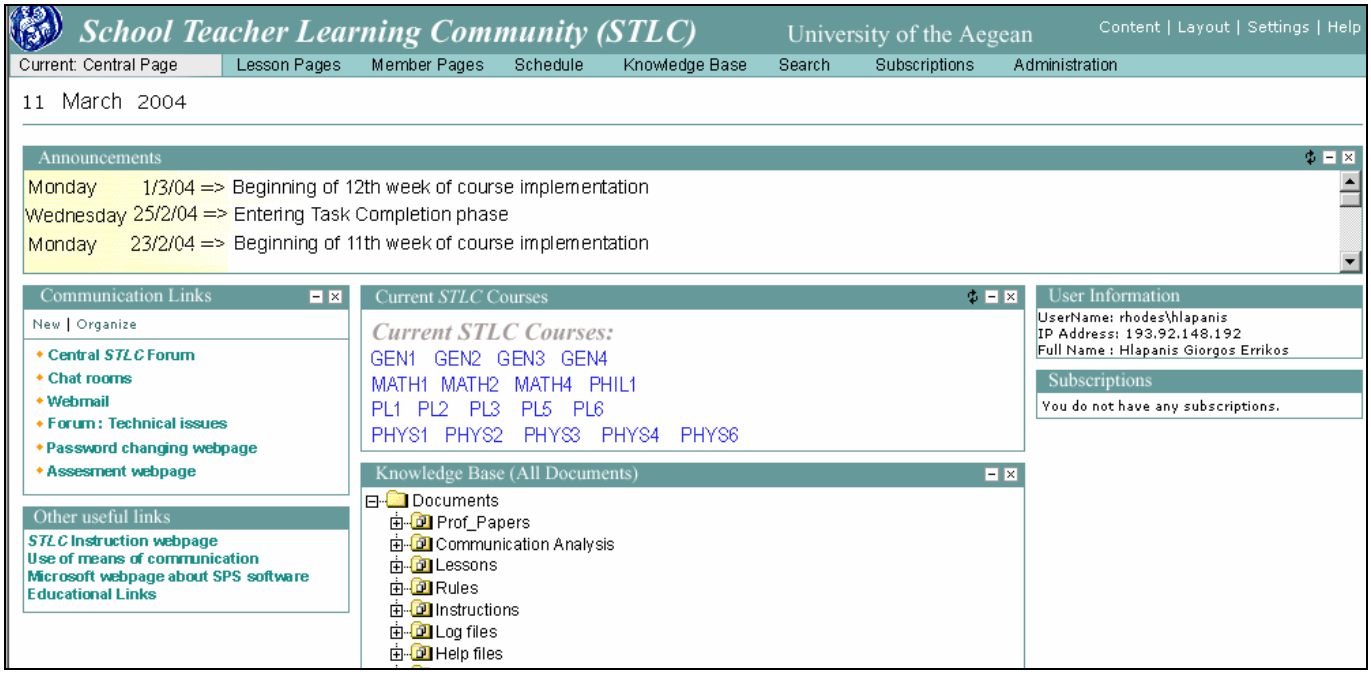

Figure 1: An instance of the central page of the School-Teacher's Learning Community (STLC) *(captured on the 11th of March 2004)*

In Figure 1, the central page of the Community's platform, the following objects can be seen, from top to bottom and from left to right:
(a) University of the Aegean logo and the title of the In service Education program (b) The available webpages bar, linking to webpages such as lesson pages, member description pages, all available documents (the *Community's Knowledge Base*), search services, etc. (c) The current date. (d) The Announcements window.
(e) The ***Communication Links*** window providing quick access to the most important communication services, (General Community fora, chat and webmail). The same window gave access also to Self-Assessment webpage, providing visualised information on the interactions and participation level of the whole community as well as of each member (represented by codes) .
(f) The ***Current*** program's ***Course*** window, providing quick access to the *space* (appropriate webpage) of each lesson that is currently conducted. (g) The user information window, and (h) other useful links window.
(i) The ***Knowledge Base*** window, providing access to all available documents, projects, results, assessments, etc. of the *community.*
(j) The ***Subscriptions*** window, supporting awareness on any change that has occurred in objects (lesson space, document, folder, etc) that the user has indicated that it was interested in.

3 Issues of implementation of the course model

Some important issues of implementation of the proposed course model that was applied within the framework of the "School-Teacher's Learning Community" are presented in this section. As with the Learning Community that hosted the courses, it was attempted to create appropriate conditions for the above mentioned parameters of 'knowledge acquisition', 'social interaction' and 'expression of identity', to all aspects of the web-based courses as well, such as: the "*Available Artifacts*", "*the Course conduction Structure*", the methods of interaction enhancing and the "*Community and Course Rules*" to follow, the moderation involved, even the use of educational material.
Instructors were advised to follow the proposed "course conduction structure", with emphasis given to negotiation and flexibility, during the carrying out of each lesson stage. Also the instructors were encouraged to use as much as possible the "Rules" of the model, such as the complete clarification of all aspects of the lesson and especially that of the self-assessment (in individual and course-community level), the proposition of cooperative or collaborative learning activities, the relativity of the handed over tasks with the student's interests, the consistency required, etc.

3.1 Special Artifacts used in Course conduction

The central artifact for each course was the dedicated '*learning space';* a virtual area where all elements and information concerning the course implementation could be created, placed and retrieved. This separate learning space for each course was implemented within the structure of the overall software platform of the Learning Community and its management was assigned to the instructor responsible for each different course. Security artifacts could be used if needed and by default, instructors, as well as the *Community's* e-moderators, had full access to this *space*, while the access of the members that attended the course could be restricted, depending on the instructor's and students' desire and needs for the course.
Moreover, the learning space was fully parameterizable, due to the capabilities of the software used (*SPS*), in order to adjust to different educational needs. Instructors could change any parameter concerning *their* web-page, even adding or deleting the default objects of the page. As long as a course had not yet completed there was a link to it at the central page of the software platform leading directly to its *space* web-page (as in *Current STLC Courses* window in Figure 1).
An instance of a typical *course-space* (that of course GEN1) is presented in Figure 2.

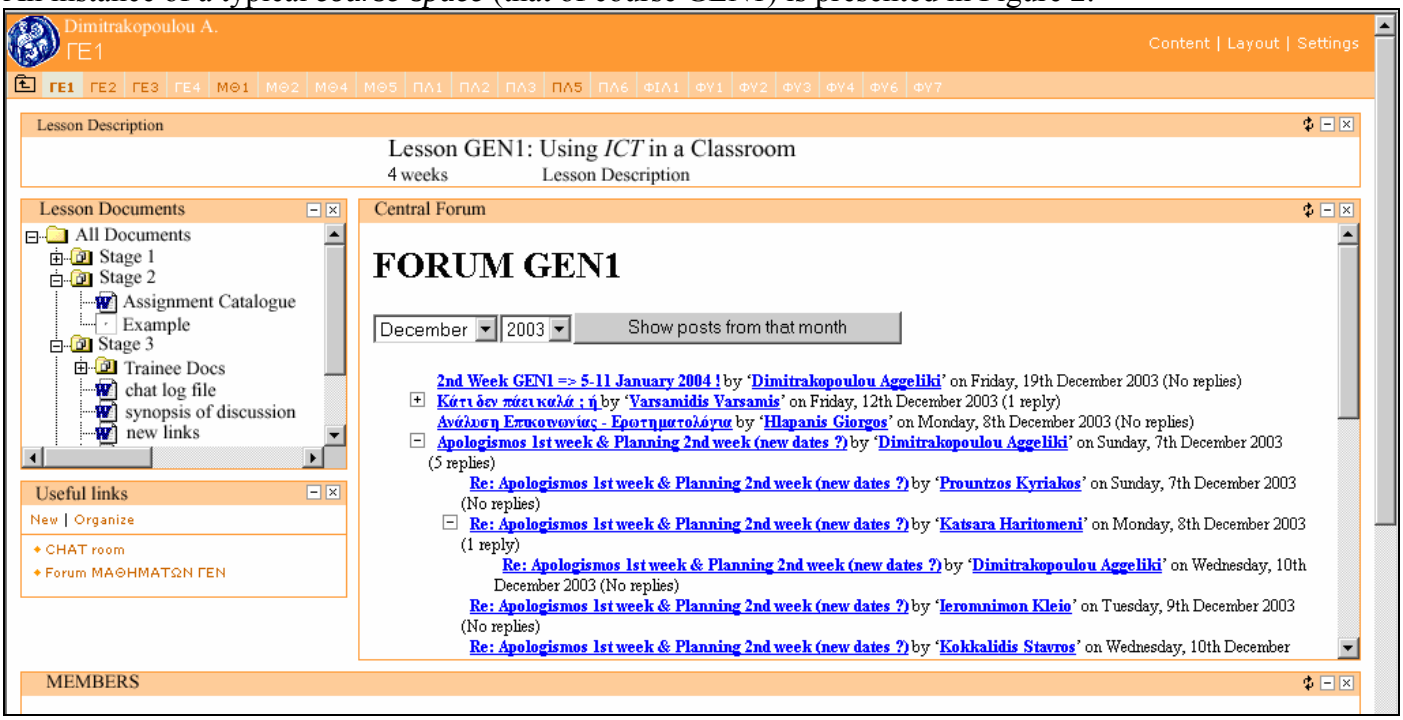

Figure 2: An instance of a typical lesson-space page, that of course GEN1 (Using ICT in a Classroom), {*captured on the 20th of December 2003*}

In the screenshot of Figure 2, the following objects can be seen, from top to bottom and from left to right: *(a) University of the Aegean* logo, the name of the instructor responsible for the course implementation (here Dimitrakopoulou A.) and the code of the course (here GEN1). (b) The available webpages bar, linking to the parent webpage and the other available webpages on the same level, i.e. the other available course-space pages. The currently selected webpage is highlighted (gray) and the last visited pages are also highlighted (as black instead of white). (c) The Course ***Description*** window, displaying the title, the duration of the course and providing a quick link to a document which described the course in detail (learning targets, content, stages, ways of assessment and self-assessment, rules, schedule, etc.).
(d) The ***Documents*** window, displaying and giving access to all available documents in the particular course, such as documents relative to the available educational material (presentations, papers, articles, examples, assignments, etc.), or documents presenting data relative to the course (for example discussion synopsis, log files of conversations, memos, etc.), or even the student's projects and assessment results. The e-moderators of the *community* and the instructor of each course could access all documents and could create or change folders, while students had more restricted access adding documents concerning their work in specially designed folders of this document structure, without the right to delete.
(e) Even if it is not appeared explicitly in the screenshot of Figure 2, it is worthwhile to note the use of built-in services of the platform that provided significant functionality concerning Web-based collaborative applications. A virtual storage area accessed via the Web was provided as if it was a local disk. Document publishing control was also provided thus preventing access to semi-finished assignments by unauthorized users and enabling ***collaborative document creation***. Documents could be checked out in order to be processed and checked in when processing was finished, in order to avoid conflicts between the collaborators. Finally version tracking was provided to record the history of documents and avoid accidental overwriting by other users (Bratitsis et al. 2003a).
(f) The window presenting the ***Discussion Forum***. Every student attending the course could add a message in the discussion taking place, which was usually used by the instructor as the basic mean of moderating and coordinating the course. Through this asynchronous discussion service, reflection, mediation and negotiation concerning the course often took place. Periodically the forum could also be used as a mean for making announcements concerning only students attending the particular course.
(g) The ***Useful Links*** window, which provided quick access to interesting (according to the instructor) links (in Figure 2 there is a link to a "Chat Room" and the central forum of the overall Learning Community)
(h) Finally, the ***Members Profiles*** window presenting information (cut here for anonymity reasons) concerning each student and instructor enrolled in the course, such as his/her name, subject, email address, telephone numbers, etc is shown in the screenshot of Figure 2.

3.2 Course Structure

In order to boost the occurring interaction among all participants, as well as to increase the feeling of mutual commitment and belonging (to the same group) and the degree of participation, a specific structure is proposed by the course-model. The course is conducted, according to the model, in stages; each stage must have certain goals and should be accomplished within a certain time period (for example 1-2 weeks). Moreover, a certain pattern of stage implementation is proposed which consists of a series of *actions*, such as:

- The *subject*, as well as the *goals* of the current course stage should only be presented as a proposal by the instructor. Time should be given to the course group in order to discuss matters concerning the subject and the goals of the stage and the final decision should be made by all members through discussion or negotiation.
- Educational *material* (references, examples, essays, papers, presentations, etc.) relative to the subject could be given later on as part of the next action of the course stage.

- The assignment of specific tasks/projects (individual and/or collaborative learning activities) should be done later on. These should better be relative to the subject and the goal of the stage. The assignments as well as the specification of teams should be preferably a product of negotiation but in some cases it could also be proposed by the instructor. Simple learning activities should be dealt with at first and complexity should be gradually built in by endorsing collaboration requirements.
- The action-circle in each stage could end by reinforcing the dialogue and interaction though the presentation of the outcomes of the accomplished assignments, the co-reflection on those outcomes and self/group assessment of them. A circle of *actions* for the next stage can afterwards commence.

Within each course stage, *social interaction* and *expression of identity* should be continual and diffused in most actions; especially through the interaction with other members in order to collaborate, through the negotiation processes and through dialogues aiming to assessment and reflection in both individual, group and/or community level. This could be a very difficult task for the instructor who should be constantly trying to spark constructive and meaningful interaction by means of e-moderation and motivation. Some motives could be linked to the Learning Community such as the publishing of the project results to the whole of the Community. In every case support, commitment, negotiation and acceptance of common goals are also required (Palloff & Pratt, 1999).

It is to be noted that "*expression of identity"* can be mainly materialized through constructive criticism and reflection. *Knowledge* is mostly *acquired* through the creation of practices (Wenger 1998), by participating in the accomplishment of the team projects mainly, but also as a result of the co-reflection on the activities outcomes and the assessment of these results. In every case, cognitive processes can be distributed between people and artifacts, or between different cognitive agents and therefore interaction is crucial in order to accomplish *knowledge acquisition* (Norman, 1993 and Perkins, 1993),

3.3 Rules, methods and e-moderation involved

According to Wenger (1998), in order to create a Community, rules that determine the way participants interact are needed. By taking also into account the above mentioned e-supported course parameters, several methods and rules of interaction are derived, applied to the Learning Community as well as the proposed model.

a. ***E-moderation***. According to Garrison & Anderson (2003), e-moderators are considered: *"…teachers who design, facilitate and direct the cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes*." According to Vlachopoulos & McAleese (2004), two distinct approaches for *e-moderation* are defined: **Low** or *non directive moderation* style, when instructors intervene with students in order to help them 'reflect' while progressing their discussions and **High** or *directive moderation* style, when instructors intervene in both the process of the on-line course and the in the content as well. According to the proposed model, High and Low e-moderation should be used in turns. The exclusive use of *directive moderation* style brings on many long and analytical messages containing the moderator's and instructor's point of view and could generate inactivity among the students and therefore should be avoided. Low *e-moderation* should also be used regularly, mostly as a mean of encouragement and facilitation. *Non-directive moderation* can make inactive students engage in conversations, participate, become more active. The instructor could of course use directive moderation style in order to drive conversations towards the desired results, yet without intervening too much because that could turn students into passive participants and therefore passive learners which was not desired.

b. ***Rules*** regarding each ***course*** in general should also be applied:

- There is a great need for clarity. What is expected to be done by students should be clarified at the beginning of each course stage. Also the way of the individual assessment, in the frame of each course should be clarified.

- It should be taken into account that the courses are addressed to adults-professionals which are usually working and have a lot of commitments. Full use of the advantages of e-supported course, such as working in a convenient place and time, should be made, as well as their availability in specific time periods, so as to planify the learning activities.
- Learning is accomplished through a process related to the activities, the context as well as the culture within which is it accomplished (Lave, 1988 and Wenger, 1990); it is related to the environment within which it is materialized and therefore tasks and assignments should be related to and derived from the daily practice of students (teachers in schools). In such a case, the best possible learning outcome will be achieved, because the knowledge acquired will be useful in everyday practice.
- Moreover, assignments should be intriguing and oriented towards team working and collaboration, thus complying with the model's principles. As previously mentioned, simple learning activities should be proposed at first and complexity should be gradually built in, through the endorsement of collaboration requirements. For instance: (a) Collaborative writing in small groups of 2-3 members (e.g. on how to deal with the constraints of the existing school conditions), (b) Discussion in a whole group via forum, in controversial issues, accompanied by synthesis on the points of views and reflection on the derived synthesis, (c) Jigsaw collaborative scenarios for the design of innovative teaching sessions in school class.
- Instructors should be open minded and able to negotiate in a number of cases, such as the determination of the subject and goal of a particular course stage, project assignments, group discussions, team divisions, innovation acceptance, etc.
- The degree of participation and activity of each student individually, as well as of the whole group should be monitored by the instructor via any means available (e.g. chat, e-mail, forum, even telephone). Furthermore, instructors have to decide every time the appropriate type of e-moderation.

c. ***Rules*** regarding ***behaviour*** and ***communication***, should also be applied:

- Reliability, understanding, honesty, mutual respect, and integrity must be some of the basic characteristics of the instructors' and students' behavior in the frame of the implementation of the course-model. The intention of the instructor should be the creation and establishment of a friendly and intimate environment within which the students can work and learn. All messages should be politely written, no offence should be allowed in any way, and encouragement should be pursued in every opportunity, both by the instructor as well as fellow students. The practice of such behaviour is the responsibility of all participants but the instructor, through e-moderation, can enforce it in a great extent.
- Whenever a question is asked, an answer should be given, regardless who the sender and the receiver are.
- Immediate notice should be given for any change concerning the course (for example change of schedule, change of subject, change of project assignment, etc.), preferably by the use of several means of communication.
- Means of communication should be used in a supplementary manner and the exclusive use of only one (perhaps convenient) mean should be avoided. For example, *email* could be used for personal messages or interaction between members of the same group, *forum* could be used as a memorandum which refers to all students, *chat* could be used as a mean to negotiate in real time, etc. If possible, all available means of communication should be used; some students might be more capable or content with different types of communication.

The model under examination was based on the consideration that e-learning can be accomplished through numerous online communication and collaboration activities, given the appropriate educational resources and communication services. The content of each course should be dynamically and radically changed according to the students' needs and the progress of the activities assigned. This should be done by the instructors as a result of continuous negotiation and discussion.

5 Research issues: Dependent and independent variables

During the implementation of the proposed model in the "School-Teacher's Learning Community", a research study took place. Our research can be described as a *case study* with interpretations based on quantitative as well as qualitative data. Questionnaires were being answered by all participants in the Learning Community (instructors and students), mostly via the completion of web-based forms or by sending emails. Semi-structured interviews were conducted during different phases of the program implementation, involving both instructors and students and were audio-taped. The interviews typically lasted 40 to 60 minutes. In addition to these data sources, interpretations were triangulated using measurements concerning each member's participation and communication. Data relevant to these measurements were derived by using "Social Network Analysis" methods (Nurmela et al. 2003, Martinez et al. 2003, etc.); parameters such as "network density" and "centralization" were calculated and graphs presenting the communication structure were produced and analysed (Hlapanis, 2006).
Human *"Activity"*, according to "Activity Theory" (Leont'ev 1974, Luria 1974), constituted our basic unit of analysis. An important issue that was taken into consideration was the '*studying of all the different human activities that constitute a Learning Community*', such as the one of our case study. Such "Activities" that were studied in detail were the "*Community Creation and Sustenance Activity"* as well as the *Activity* of the "*Organising of a Teacher Education Program"*. An essential Activity, upon which our research mostly focused, was the "*Implementation of electronically Supported Courses"* in order to achieve teacher education (Hlapanis, 2006). As previously mentioned, "School-Teacher's Learning Community" constituted a framework within which the model of electronically supported course was implemented. This model was beforehand prescribed and based on the theoretical framework of the research; therefore a basic assumption of the study was that the adhesion to the model would relate to positive learning results, *success* in the course implementation. Considering that the "School-Teacher's Learning Community" (STLC) was, like the course model that it hosted, in its self *open*, instructors were allowed to apply the proposed course model according to their desire. Therefore different degrees of the model's substantiation occurred within the Learning Community. One of the main research questions that arose was the validity of the previously mentioned hypothesis, or '***In what degree does the model implementation relate to successful course results?***'

5.1 A definition of the successful implementation of a course - Dependent Variables of the Analysis

Prior to the assessment of the implementation of electronically supported course implementation, it is necessary to define what should be considered as such. According to our research, *successful* course implementation is measured by taking into account widely applied methods of course assessment emphasize the examination of the learning results, counting the degree of satisfaction of the participants and the accomplishment of the signified goals of the course (Barnes, 1986; Calder, 1994; Britain and Liber, 1999). Taking into account these methods to assess the effectiveness of the lessons conducted in STLC, some essential elements that constitute a *successful* lesson were considered, such as:
The degree of *accomplishment* of the predefined course *objectives*, from the point of view of both the instructor and the student.
Certain fact-based elements, such as the *completion* or not of all the stages and actions of the course, the percentage of students that attended, also the percentage of those that passed, even the average grade given (although that may be considered subjective in some cases).
The degree of *communication* and *interaction* among the participants, as a key factor for the attainment of learning, according to the previously mentioned theoretical framework.
The degree of *knowledge* constructed as a result of the course implementation, in any way it can be justifiably measured. The above elements defining the degree of success of each course implemented in the "STLC" consisted in fact the basis of the *dependent variables* of our analysis.
In order to look into the degree of *accomplishment* of the predefined course *objectives*, data gathered from questionnaires and interviews were used. Appropriate *Likert*-scale questions answered both by instructors and students were taken into account and the answers were matched up to comparative results of the

conducted interviews. In some cases triangulation of interpretation was possible, when for example the predefined course objective was a certain product that was or was not finally produced.
The degree of *knowledge* obtained was quite difficult to measure; again appropriate *Likert*-scale questions were answered by students and instructors and interpretation of interview results were taken into consideration. In some cases fact-based data could affirm these results, such as the accomplishment of a task that required certain *abilities* and *knowledge* by the students, which were not known to exist prior to course implementation. Another way of *indirectly* measuring the degree of *knowledge* obtained was the comparison of answers concerning issues that were dealt with during a course, given prior and after the implementation of a course. Yet, such interpretations were not quite straightforward because some students attended simultaneously more than one courses and many courses required similar tasks, even if the content differed.
Fact based elements of our course success definition were easier to measure. Most of the communication and interaction parameters were calculated by using *Social Network Analysis* methods, as previously mentioned. Measurements concerning these fact based elements are straightforwardly used as a basis for certain *dependent variables* of our analysis. Several answers of students and instructors to questions concerning the elements of the degree of *accomplishment* of the predefined course *objectives* and the degree of *knowledge* obtained as previously described, were also used as *dependent variables* in our analysis.
In order to generate quantitative analysis results, two more *dependent variables* were defined, as the overall assessment of each course according to the instructors' and students' opinions. These results are presented in the following Table 2 and the variables were measured as an average of several answers (to *Likert*-scale questions of 1-5) given by instructors and students concerning each individual course and the direct assessment of the above mentioned elements of our definition of course success.

Table 2: Assessment of courses as an average based on answers of both students and instructors considering the defined elements of success of a course

No of Les.	**Course Code**	**Assessment of Courses based on students' answers (average of 15 different answers *Likert*-scaled from 1 to 5)**	**Assessment of Courses based on instructors' answers (average of 10 different answers *Likert*-scaled from 1 to 5)**
1	**GEN1**	**4,14**	**3,36**
2	**GEN2**	**4,17**	**3,56**
3	GEN3	Not Answered	1,14
4	**GEN4**	**3,57**	**3,53**
5	**PHIL1**	**4,14**	**3,61**
6	**MATH1**	**5,00**	**4,52**
7	**MATH2**	**4,00**	**3,59**
8	**MATH4**	**3,71**	**3,51**
9	PHYS1	2,14	2,50
10	**PHYS2**	**3,86**	**3,49**
11	**PHYS3**	**3,71**	**3,52**
12	PHYS4	1,67	2,55
13	PHYS6	2,29	2,62
14	PL1	3,43	3,31
15	PL2	Not Answered	1,50
16	PL3	3,71	2,87
17	PL5	3,29	2,89
18	PL6	2,86	2,79

5.2 Independent Variables of the Analysis

As previously mentioned, within the STLC, instructors could apply the proposed course model according to their willingness and in order to examine the *degree that the model implementation relates to successful course results*, several *independent variables* had to be determined. Such variables were mostly related to

instructors' choices concerning the course and structure and especially e-moderation and communication policies that were materialized during each course implementation, such as:

The degree of *adherence* of each course to the predefined implementation model. This was mostly measured by studying instructors' answers to appropriate questions in the questionnaires. Students could not directly answer such a question because they ignored the proposed course implementation model, for obvious reasons. Results were confirmed by analyzing instructors' interviews and in some cases triangulation of interpretation was possible by studying elements of course conduction, such as the artifacts that were used, the course structure and rules that were applied.

The *collaboration* policy that was endorsed by the instructors in each course. This is connected to the degree of cooperation that was demanded in order to achieve course tasks, the degree of use of the existing collaboration oriented services (artifacts) that were provided within the program's software platform and the general course structure. The *collaboration* policy was determined by evaluating answers of both instructors and students to appropriate questions in the questionnaires. Again results were confirmed by analyzing interviews and by examining the degree of use of collaboration oriented services, as well as the type of tasks assigned during the course.

The *e-moderation* policy and *communication* policy that was followed by instructors during the course. This is connected to the number and type of the means of communication that were used by the instructor, the communication services that the instructor encouraged the students to use, but most of all by the ways and the degree of the instructor's participation in conversations and argumentations. An important issue was whether the instructor used *high* and *low* e-moderation in a balanced way (as prescribed by the model) and what kind of interventions the instructor made in each situation that emerged during the course. *Independent* variables that are derived by this factor of analysis are based on answers given by both instructors and students, as well as to the analysis of interviews. Moreover *independent* variables of the analysis constitute fact-based data (for example the number of a instructor's interventions that were written down) and data coming from *Social Network Analysis* of each course (for example the *density* of the network or the *centralization* factor of instructors' messages).

The degree of *freedom of choice* that was given to students by each instructor. According to the predefined model, a substantial degree of freedom should be given, enabling students to decide upon a number of issues concerning the course implementation, such as the subject and the goal of a particular course stage, the assignment of projects, the division of the course group in teams, etc. This degree of *freedom* given in each course, as an *independent* variable, was measured by examining the answers given in the questionnaires and by analyzing dialogues that took place during the course with means of communication that were preferably used for negotiation (mostly forum and chat).

The degree of *suppleness/flexibility* of each instructor. Whether there was acceptance for innovation, whether course targets were dynamically changed whenever necessary, the degree of adaptation of tasks and assignments to the students' special needs. Interviews and questionnaires were used so as to determine this independent variable.

The degree of *reliability and consistency* of each instructor's participation. Some instructors were more dedicated to their task of carrying out the course than others. This is a parameter that could influence course assessment and was therefore considered an *independent* variable. It was measured directly by answers given to appropriate questions in questionnaires and indirectly by examining the type and degree of communication in each stage, the feedback given to students and to the e-moderators of the overall Learning Community.

Table 3: Certain independent variables measured in a Likert-scale manner

No of Les.	**Course Code**	Degree of adherence of each course to the predefined course *implementation model*	Degree of *collaboration* required in course assignments	e-moderation policy: degree of *interventions* made by the instructor	Degree of *freedom* of choice that was given to students	Degree of *suppleness/ flexibility* of instructor	Degree of *reliability* and *consistency* of the instructor's participation
1	GEN1	4	3	4	4	3	3
2	GEN2	4	2	2	4	3	1
3	GEN3	1	1	1	Not defined	Not defined	1
4	GEN4	5	3	4	5	4	3
5	PHIL1	5	4	4	5	3	1
6	MATH1	5	5	4	4	1	2
7	MATH2	2	5	1	4	1	3
8	MATH4	4	4	3	4	3	2
9	PHYS1	1	2	2	5	3	3
10	PHYS2	3	2	4	5	3	3
11	PHYS3	3	2	3	2	3	3
12	PHYS4	2	2	3	2	1	2
13	PHYS6	2	1	2	2	1	3
14	PL1	2	1	1	1	1	3
15	PL2	1	1	1	Not defined	Not defined	1
16	PL3	2	2	4	5	1	3
17	PL5	2	1	2	4	1	2
18	PL6	2	1	1	2	1	1

6 Analysis results

In order to support the hypothesis that the ***proposed model implementation directly relates to successful course results,*** our analysis mostly concentrated on revealing existing correlations among previously defined elements of course assessment (as *dependent* variables) and *independent* variables related to instructors' choices concerning course conduction and structure. These *independent* variables specify the extent to which the proposed model was implemented and indirectly reflect the Learning Community principles that were put into practice. Some of the most characteristic correlations and results are presented in this paper in the following sections.

6.1 Correlations regarding the proposed course model

First of all it is needed to mention that many correlations were found among the basic elements of the course model (as *independent* variables) and the degree of adherence of each course to the proposed model, as a dependent variable, according to the instructor's opinions; thus confirming the validity of the model proposal.

For example, the degree of *flexibility* of instructors (the degree of dynamic change of assignments and targets to the students' specific needs, as a choice made by instructors and an independent variable) according to students' opinion, was proven positively related (Pearson's $r = +0.705$, $df = 13$, $p=0.002 <0.01$) to the degree of the adherence of the corresponding course to the predefined model, according to instructors' opinion (as the *dependent* variable). Also, the number of different means of communication used by instructors (as a fact-based *independent* variable) was positively related (Pearson's $r = +0.485$, $df = 13$, $p=0.048 <0.05$) to the same *dependent* variable (the adherence of the corresponding course to the proposed model).

6.2 Fact-based elements defining the success of course implementation

Some fact-based elements define the success of the implementation of a course, such as the course completion, the percentage of students that attended and the percentage of those that passed, even the average grade given. Criteria of the success of a course were arbitrary set during our analysis and courses GEN3, PHYS4 and PL2 that did not complete were considered as *failures* by that alone. Also courses that

when completed had less than 50% of the initial number of students attending them, could not be considered as highly successful and such courses were PL1, PL3, PL5 and PL6.
As anticipated, the courses that failed these basic criteria were also considered as *not* successful by both instructors and students and this corresponds to the course assessment as shown in Table 2.

6.3 Correlations regarding the degree of accomplishment of predefined course objectives

Quite a few correlations directly support the assumption that the course model implementation directly relates to successful course results. For example:
The degree of *adherence* of each course to the predefined implementation model (as a choice made by instructors and an independent variable) according to instructors' opinion, was proven positively related (Pearson's $r = +0.696$, $df = 13$, $p<0.01$) to the Likert-scale assessment of each course, according to students' opinion (as the *dependent* variable).
Moreover, the degree of *adherence* of each course to the predefined implementation model (as a choice made by instructors and an independent variable) according to instructors' opinion, was proven positively related (Pearson's $r = +0.704$, $df = 13$, $p<0.01$) to the degree of gains acquired during the course attendance, according to students' opinion (as the *dependent* variable).

6.4 Correlations regarding key elements of course conduction model

There are also many correlations regarding key elements of the course model, implying that it increases positive results when implemented, such as:
The number of *tasks*/*projects assigned in each course* (as a choice made by instructors and an independent variable), was proven positively related (Pearson's $r = +0.706$, $df = 16$, $p<0.01$) to the Likert-scale assessment of each course, according to students' opinion (as the *dependent* variable).
The number of *tasks*/*projects assigned in each course* (as a choice made by instructors and an independent variable), was proven positively related (Pearson's $r = +0.697$, $df = 16$, $p<0.001$) to the degree of gains acquired during the course attendance, according to students' opinion (as the *dependent* variable).
According to the proposed course implementation model, frequently assigned collaboration oriented tasks/projects were expected to boost knowledge acquisition and evidently they increased the gains acquired by students due to the course attendance.
Moreover, the degree of degree of *suppleness/flexibility* of each instructor during the course conduction (the degree of adaptation of tasks and assignments to the students' special needs as a choice made by instructors and an independent variable) according to the students' opinion, was proven positively related (Pearson's $r = +0.616$, $df = 16$, $p<0.01$) to the degree of gains acquired during the course attendance, according to the students' opinion (as the *dependent* variable).
The degree of *collaboration required in the course projects* (as a choice made by instructors and an independent variable) according to instructors' opinion, was proven positively related (Pearson's $r = +0.677$, $df = 13$, $p<0.05$) to the Likert-scale assessment of each course, according to students' opinion (as the *dependent* variable).

6.5 Correlations regarding the degree of communication and interaction

Correlations regarding the degree of communication and interaction were found that support the hypothesis, mostly concerning fact-based variables, such as:
The number of *announcements posted on courses' fora* as well as the number of *email messages* sent by each student (as independent variables), were positively related (Pearson's $r = +0.598$, $df = 48$, $p<0.001$ for the announcements and Pearson's $r = +0.491$, $df = 48$, $p<0.001$ for email messages respectively) to the number of courses each student passed (as the *dependent* variable).
Also, the degree of *concentration* of each member's email messages (as an SNA parameter and independent variable), was *negatively* related (Pearson's $r = -0.427$, $df = 48$, $p=0.002 < 0.01$) to the personal percentage of success of each student in the courses. This was anticipated because *concentration,* as an SNA parameter, represents the opposite of the diversity of each member's communication. The more *concentrated* a member's communication was, the less peers the member contacted with and vice versa.

Already it had been found out that the adherence of each course to the predefined course implementation model was connected to '*success'* of course conduction, as shown by correlations in paragraph 6.3. Considering courses GEN1, GEN2, GEN4, MATH1, MATH4, PHYS2, PHYS3 and PHIL1 which were assessed as having a degree of adherence to the proposed course model of at least 3 (out of 5 in Likert-scale, as shown in Table 3), some more interesting correlations were found, such as:
The number of each student's messages posted on the platform forum (as an independent variable), was *positively* related (Pearson's $r = +0.373$, $df = 57$, $p = 0.003 < 0.01$) to the number of the above mentioned courses (GEN1, GEN2, GEN4, MATH1, MATH4, PHYS2, PHYS3 and PHIL1) students attended. Moreover, the degree of *concentration* of each student's email messages (as an SNA parameter and independent variable), was *negatively* related (Pearson's $r = -0.566$, $df = 57$, $p < 0.001$) to the number of the above mentioned courses students attended.
Some correlations which concern variables based on participants' opinion, were found that support the hypothesis, such as the degree of interaction with peers in each course, according to student's opinion, which was *positively* related (Pearson's $r = +0.537$, $df = 16$, $p = 0.039 < 0.05$) to the degree of *success* of each course as a result of instructors' assessment (as shown in Table 2).

6.6 Correlations regarding the degree of knowledge obtained as a result of course implementation

The degree of *knowledge* obtained by students due to their participation to a certain course was something difficult to be measured, as previously mentioned. Interpretations were not quite straightforward because some students attended simultaneously more than one course and many such courses required similar tasks, even if differing in content. Yet, by comparing answers given by students concerning issues that were dealt with during a course, given prior and after the implementation of such a course, could give us some results. In order to support our hypothesis, a distinction was made during the analysis, between courses that had a different degree of adherence to the proposed course implementation model. Two groups of courses were separately examined, those with a high degree of adherence to the predefined course model (at least 3 out of 5, i.e. GEN1, GEN2, GEN4, MATH1, MATH4, PHYS2, PHYS3 and PHIL1) and those with a low degree of adherence to the predefined course model (less than 3 out of 5, i.e. the rest: GEN3, MATH2, PHYS1, PHYS4, PHYS6, PL1, PL2, PL3, PL5, PL6). Each course's exact degree of adherence to the predefined model, according to instructor's opinion, was previously presented in Table 3. Due to the dependency of the examined groups of students, ***correlated T-tests*** were used as a means of analysis. Some interesting results are presented:

Table 4: Average of student's answers about the degree of ICT they are willing to use in their classrooms, prior and after the participation to courses that had a high degree of adherence to the proposed course implementation model.

	Answering stage	N	Mean	Std. Dev.	Std. Error Mean
Student's given answers (average) about the degree of ICT they are willing to use in their classrooms	Prior to course participation	34	2.59	1.480	0.254
	After course participation	28	4.04	0.744	0.141

As shown in Table 4, for students who attended high adherence courses (GEN1, GEN2, GEN4, MATH1, MATH4, PHYS2, PHYS3 and PHIL1), the average degree of ICT they were willing to use in their classrooms prior to course participation (M=2.59, SD=1.480), was significantly less (t= -4.989, df=50, 2-tailed $p < 0.001$) than the average degree of ICT they were willing to use in their classrooms after course participation (M=4.04, SD=0.744). By examining the answers given by students who attended only low adherence courses (GEN3, MATH2, PHYS1, PHYS4, PHYS6, PL1, PL2, PL3, PL5, PL6), no significant difference ($p > 0.05$) could be measured between answers given prior and after course participation.

Moreover, again for students who attended high adherence courses (GEN1, GEN2, GEN4, MATH1, MATH4, PHYS2, PHYS3 and PHIL1), the following significant differences in their beliefs were detected:
The average degree of positive impact the use of ICT in a classroom can apply, according to students' belief prior to course participation (M=4.24, SD=0.431), was significantly less (t= -3.848, df=59, 2-tailed $p < 0.001$) than the average degree of positive impact the use of ICT in a classroom can apply, according

to their belief after course participation (M=4.68, SD=0.476). When answers given by students who attended only low adherence courses were tested no significant difference ($p > 0.05$) could be measured between answers given prior and after course participation.
The average degree of knowledge concerning matters relevant to course content, according to students' belief prior to course participation (M=2.68, SD=1.173), was significantly less (t= -3.169, df=59, 2-tailed $p=0.003 < 0.01$) than the average degree of knowledge concerning matters relevant to course content, according to their belief prior to course participation (M=3.54, SD=0.962). This was no result of diminished inclination to feed back to the instructors because non answers were not taken into account.
The average degree of preference for "*Learning Communities*" as a method of continual in-service training and education, according to students' belief prior to course participation (M=0.00, SD=0.000), was significantly less (t= -2.089, df=59, 2-tailed $p =0.044 < 0.05$) than the average degree of preference for "*Learning Communities*" as a method of continual in-service training and education, according to their belief after course participation (M=0.11, SD=0.315). It is quite noticeable that prior to course participation students' preference was null.

7 Conclusions and Discussion

In terms of methodology, the analysis described in this paper can be considered as part of a boader *case study* research with interpretations based on both quantitative and qualitative data. Data collected from instructors and students were: (a) e-Questionnaires. Appropriate *Likert*-scale questions were taken into account and the answers were matched up to comparative results of interviews that were conducted. (b) Semi-structured interviews conducted during different phases of the program implementation. (c) The automatically generated logfiles capturing the occurrence of actions or events and (d) the instructors' reports about their students achievement.
Through the analysis that took place, presented in this paper, many conclusions can be directly derived. First of all, the type and number of correlations that were found among the basic elements of the course model and the degree of adherence of each course to the proposed model confirmed the validity of the proposal. Thus, instructors were fully aware of the model we had in mind and therefore consciously chose to follow or not to follow its guidelines. Also, some axiomatic criteria for a courses' success such as course completion, the percentage of students that attended and the percentage of those that passed, are consistent with results derived by instructors' and students' assessment of courses, as shown in table 2. This assessment was based on questions reflecting elements of our definition of a successful course implementation, and therefore confirms this definition.
Most importantly, the type and number of correlations between key elements of the course model and parameters assessing a course's success that were detected, support to a great extent the basic hypothesis of the research, i.e. that the proposed course model does in fact directly relate to successful course results when implemented. Correlations even existed that directly related the degree of adherence of each course to the predefined model to immediate course assessment, thus supporting this basic assumption even more.
Also, some interesting observations concerning the degree of knowledge constructed and learnt as a result of course implementation were made, that connected (even if done so indirectly) this difficult to measure success parameter to the course model implementation. Based on the analysis of the data collected, *the most successful courses* were the ones that had a high degree of *communication* and *interaction* among the participants and focused on cooperation, negotiation and flexibility during their conduction.
Due to the influence of the proposed course model by the Learning Community general principles and learning theories derived from the socio-constructivism paradigm, an overall important conclusion is that a somewhat formal course design can be successfully implemented in such an environment (an open *Learning Community* environment) and can meet the prerequisites of established theory and research. In fact, the closer the course implementation is to the fundamental principles of these theories, the greater the success of the course. A 'remedy' for successful course implementation dictates and involves a great use of interaction and communication creating social interaction, frequently assigned collaboration oriented tasks that can boost knowledge acquisition, the development of apprentice knowledge workers instead of passive listeners through the use of negotiation mechanisms and suppleness on behalf of the instructor,

criticism and reflection on current educational conditions, in other words through the development of expression of identity within the course. Moreover, artifacts used in such a course should meet the same prerequisites, therefore should be in advanced designed or chosen as such. Also rules, methods and e-moderation should be applied in order to further ensure success.

All of the above elements of course conduction, as well as a proposed course structure that applied to the previously mentioned fundamental principles, were put into practice during a distance learning educational program, concerning further education of in-service primary and secondary education teachers in Greece. The above mentioned important conclusions were the result of the case study and the analysis that took place during research simultaneous to the program running. Yet, another quite important conclusion was that the proposed course model implemented within the framework of a Learning Community can in fact function, even under difficult conditions such as those of the case study. 'School-Teacher's Learning Community' opened a new path in in-service teachers education perspectives in analogous cases by surpassing obstacles related to geography, finance, perceptions and attitudes, even technology (Hlapanis & Dimitracopoulou 2004). It is to be noted, that a number of additional features and research questions related to this actual effort were also explored (Hlapanis 2006, Hlapanis, Kordaki & Dimitracopoulou 2006), while others should be subject to further improvement and studying in order to be widely applicable and efficient in the future.

Finally, another contribution of this paper is that certain aspects concerning the complex problem of course assessment were presented, through the definition of specific elements of a course that were studied during the present case study. Further looking into this particular research area can be done, thus producing more accurate and especially more immediate (computer-based) results during a course implementation.

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