



Innovative Technologies
for Collaborative Learning
and Knowledge Building

D8.1 Guidelines for teacher training and technical and pedagogical support

**ITCOLE teacher training and consulting model
30.4. 2002**

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**IST-2000-26249
ITCOLE Project**

WP8

ITCOLE Project
IST-2000-26249

Deliverable / Title of the document:

D8.1 - Guidelines for teacher training and technical and pedagogical support.
ITCOLE teacher training and consulting model.

Contractual date of delivery to the Commission (if any):

(30.11.2002 Draft)

30.4.2002

Actual date of delivery to the Commission (if any):

(30.11.2002 Draft)

30.4.2002

Nature of the deliverable/document:

Report

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Abstract:

This document describes the ITCOLE teacher training and consulting model.

The main purpose of this document is to give guidelines for teacher training and consulting when guiding teachers to develop and implement new pedagogical practices on collaborative learning supported by Synergeia learning environment. This document aims to empower the change of teaching and learning culture in European education and considers teacher training as an important channel for the dissemination of pedagogically meaningful, best practices on CSCL created in the ITCOLE -project.

Keywords:

teacher training and consulting, pedagogical and technical support, change of educational culture, dissemination

Related documents:

D7.3 Idea bank of best practices of using CSCL in education and guidelines for scaling up good pedagogical practices

D8.2 An integrated technical and pedagogical User Manual

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1. Introduction

In this Deliverable 8.1 the ITCOLE teacher training and consulting model as is presented as guidelines for teacher training and support during the ITCOLE -project and as guidelines for further dissemination of the Synergeia learning environment and best CSCL practices produced in the ITCOLE -project to the European schools.

The ITCOLE teacher training and consulting model created is based on the objectives of the ITCOLE -project, the conclusions of the Deliverable 2.1, the planning stage of the Deliverable 7.1, the previous experiences of the teacher training of Helsinki City Education Department Media Centre and on latest research into promoting CSCL and implementing ICT in teaching.

1.1. Objectives

Deliverable 8.1 has two main objectives. The first objective is to offer a general model on teacher training and support in implementing and disseminating new pedagogical models on CSCL and Synergeia learning environment in European schools. The ITCOLE -project is considered as one of the promoters of the change of teaching and learning cultures in Europe. The model presented is planned especially for teacher in-service training organisations to promote pedagogical change and new, pedagogically meaningful models on CSCL.

The second objective of the Deliverable 8.1 is to offer practical and more concrete teacher training guidelines for ITCOLE -project partners for starting and supporting the first and the second testing phases of the project. These guidelines were collaborated in Autumn term 2001 and already published in November 2001. Also concrete examples on ITCOLE teacher training in Helsinki were introduced. The guidelines were proposals, which were free for ITCOLE partners' adaptation, modification and further development paying attention to the local needs and resources of the partners. The guidelines for testing phases are presented in chapter 4.4.

The first Draft of the Deliverable 8.1 was reflected in collaboration with ITCOLE partners in November 2001. It was agreed, that all the partners will contribute the Deliverable by reporting their pedagogical principles and teacher training solutions in more detail when some experience and information has been gathered.

In March 2002 the ITCOLE partners contributed the Deliverable 8.1. by reporting their pedagogical approach and teacher training modifications, contents and practices implemented in the first and second testing phases of the ITCOLE -project. The practical training examples, pedagogical principles and experiences of Greece, Finland, Italy and the Netherlands are introduced in the chapter 4.5. These teacher training experiences of the ITCOLE partners have created a remarkable basis for the ITCOLE teacher training and consulting model.

The goal of the ITCOLE -project is not only to implement Synergeia learning environment in European teaching but to develop and disseminate best *European pedagogical models of computer supported collaborative learning*. Teacher training is the most important

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element of dissemination of new, pedagogically meaningful practices to the schools of Europe. This is why ITCOLE teacher training and consulting model is open and adaptable for further development and modification with an European perspective and with slightly different pedagogical approaches and traditions.

1.2. Review of the contents

The perspectives of CSCL in Europe, the conclusions of the ITCOLE Deliverable 2.1, are reflected in the second chapter. In chapter three the lessons learned in Helsinki, the previous experiences of Media Centre on implementing ICT in education are compiled. The projects introduced are The Information Technology project (IT), Helsinki Virtual Webschool project and Safer Use of Internet (SUI) project. Especially is described how the teachers participating into the projects experienced the pedagogical training and support Media Centre provided during these development projects. In the third chapter also the crucial points and conclusions for planning teacher training and support in an ICT development project is drawn together for the ITCOLE teacher training and consulting model.

The fourth chapter concentrates on presenting the ITCOLE teacher training and consulting model, which is also illustrated in a diagram form in chapter 4.3. In the fifth chapter the ITCOLE -project, new pedagogical models on CSCL and Synergeia learning environment are reflected from the aspect of a changing teaching and learning culture. It is for example discussed how Media Centre utilise existing facilities in our school system to disseminate and promote CSCL and Synergeia in the schools of Helsinki. Also perspectives of dissemination in Europe is reflected by ITCOLE partners from Greece, Italy and the Netherlands.

2. Perspectives of CSCL in Europe

In Deliverable 2.1 (Lakkala, Rahikainen & Hakkarainen 2001) of the ITCOLE -project, representatives of the Netherlands, Italy, Greece and Finland presented the research and projects relating to computer supported collaborative learning that has been carried out in their respective countries. The objective of the Deliverable was to explore the perspectives of CSCL in Europe. The Deliverable summary notes that much research into computer supported collaborative learning has been done in Europe. Research has been carried out in different countries, from different perspectives and applying varying research methods. Despite these different perspectives, the theoretical background of the studies is very similar including the constructive learning concept and the socio-cultural and situational aspects to learning. Below we give a brief summary of the research angles in different countries and the main features of the CSCL projects carried out.

2.1. Greece

In Greece, research is focused on studying conceptual change especially in mathematics and science teaching. Greece has already carried out an extensive nationwide Odyssey programme designed to integrate information and communication technology and the internet into everyday school life. The programme included 19 different projects. Within the Odyssey framework, schools were equipped with the latest hardware and training for teachers, pedagogical and technical support staff. Greece is especially interested in utilising games in teaching and interactively combining diverse ways of presenting information (concept charts, geographical maps, software with a visual emphasis, etc.) in computer supported collaborative learning.

2.2. Finland

In Finland, research is concentrated on developing the pedagogical frame of reference (progressive inquiry), studying cognitive and motivational dimensions at different stages of education and on developing qualitative content analysis and a method of analysis based on video data. The Finnish projects presented are mostly carried out in a web-based learning environment (CSILE, Knowledge Forum, Workmates and Helsinki Virtual Webschool) in compliance with the principles of progressive inquiry and in close collaboration with research team. The Finnish research team is particularly interested in teacher guidance and tutoring in the progressive inquiry process, pupil motivation in collaborative learning and the difficulties in getting schools to make wide use of collaborative learning.

2.3. Italy

Italian research is especially emphasising collaboration and the forms of building virtual learning communities. The concepts of collaboration, constructivism and community have greatly influenced the background of the Italian studies. Although the theoretical background is strong, the Italians considered it a problem to make the theory a reality for use in schools. CSCL projects carried out in Italy range from collaborative production of hypermedia using the web to an international Euroland project carried out in a virtual 3D environment. The Italians take a special interest in how good computer supported collaborative learning practices can be made more widespread in schools and practice.

2.4. The Netherlands

In the Netherlands research is focused on how pupils learn to learn and on the processes of social and individual self-control. The theoretical background concentrates on developing learning environment models emphasising pupil-orientation and collaborative learning and making use of information and communication technology. In the Netherlands many projects have been carried out ranging from those utilising email to web-based learning environments and virtual 3D environments. Recent years have seen major changes in the second stage education system in Netherlands. These changes seek to harmonise general education and to change schools as learning environments to support constructive learning viewpoints.

2.5. Conclusions

The final reflections of research teams in different countries show there to be a common problem: How to integrate into everyday school life the practices of computer supported collaborative learning that the researchers have shown to be beneficial. The good experiences and practices seen as beneficial in the projects carried out have been further improved to make them suitable for everyday school life. Schools have become computerised and networked and teachers are trained in the use of software. But the question still remains as to why practices that have been shown to be useful still have not become part of everyday school life.

The conclusion of the Review (Deliverable 2.1) is that the change of the school culture is slow and challenging. The earlier attempts to promote computer supported collaborative learning have been "techno-centric" in nature. They have relied on assumptions that CSCL is mainly supported by developing technology. As a conclusion Hakkarainen, Lakkala, Rahikainen and Seitamaa-Hakkarainen (in Lakkala, Rahikainen & Hakkarainen 2001, 85-86) present that this challenge should be met by creating several infrastructures of change: technical-, pedagogical-, social- and epistemological infrastructure. By technical infrastructure they refer to that teachers and students should have an access to new technology and sufficient skills to use it. By pedagogical infrastructure the writers refer to that there should be practical and workable pedagogical models that help to find meaningful ways of using new technology in problem solving, collaboration, knowledge building and networking with external communities. By social infrastructure the researchers refer to that new technology should be an integrated aspect of core

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educational processes rather than a separate activity. The curriculum, organisation and structure of courses and assessment practices should support the new culture of collaborative learning and knowledge building. The epistemological infrastructure refers to that teachers and students need to develop epistemological awareness of different categories of knowledge and processes of inquiry in order to understand the meaning of pursuing questions and engaging in deepening inquiry.

The researchers notice that "...review reveals that in many cases these some of these conditions are missing" (2001, 86). As the next step of promoting CSCL in Europe the researchers recommend that the pedagogical models of collaborative learning and knowledge building must be further crystallised. In addition the new technology must be developed in close collaboration with the pedagogical researchers and the teachers on long time period.

Continuing teacher training and consulting that pays special attention to pedagogical and social infrastructure is one way of approaching a solution to this problem. As concluded in Deliverable 2.1, it is not enough to computerise schools and to train teachers in the use of basic software. Teachers do not just need basic information and communication technology training, but they need to reflect on how they can make use of the technology in their own teaching and what added value and new elements information and communication technology bring to teaching, studying and quality of learning. Teachers should be supported in developing pedagogical practices of computer supported collaborative learning with pedagogical researchers. Teachers should be encouraged to create networks to share their expertise with other teachers. When implementing a pedagogical innovation, as computer supported collaborative learning and knowledge building in school life, teachers need enough concrete training and support. It's important to understand that it isn't only the question of testing the pedagogical innovation but promoting the change of teaching and learning culture.

3. Experiences of teacher training in ICT development projects

3.1. Information Technology project

Helsinki City Education Department carried out an Information Technology (IT) project in 1996-2000 in line with the City of Helsinki education system's information policy (1995). The aim was to develop, create and maintain ICT services suitable for teaching together with the related training, support and research services and to equip pupils in schools and other educational establishments with the ICT skills required for working life and for further studies.

The IT project sought to improve the information and communication technology readiness of schools in Helsinki by providing teachers with further training in ICT, establishing fixed network connections in schools, improving technical support services and, above all, by providing schools with plenty of computers and peripheries (Ilomäki & Rahikainen 2001, 24). Various working groups – hardware, building, main network, technical support, learning support and research teams – were set up for projects to fulfil these various aims. The IT project lasted several years (1996-2000), during which many smaller projects were carried out. These have generated a host of useful information and experience not only about the use of information and communication technology in schools but also about the need for continuing training for teachers. Follow-up studies conducted regularly by the research team throughout the IT project provided much useful information about teachers' pedagogical philosophy, pupils' views of learning and information and the ICT skills of both teachers and pupils alike. (Muukkonen, Rahikainen, Hakkarainen, Lakkala, Lipponen, Ilomäki & Lehtinen 1999)

3.1.1. Etäpulpetti project

One example of the smaller projects carried out was the three-year Etäpulpetti ("Distant Desk") project, which experimented with the use of portable PCs as a tool for teaching and learning. Since the use of portable PCs in schoolwork was still at the trial stage, the project paid particular attention to teacher skills from the very outside. Teachers' teaching practices and ICT skills can be considered as having greatly improved as a result of the ICT and pedagogical training provided. It is worth noting that teachers were interested in their own pedagogical development and that their confidence in themselves as ICT users grew during the project. (Ilomäki 1999)

The teachers involved in the Etäpulpetti project considered it especially positive that the project focused on the pedagogical development of teachers instead of merely improving technical skills. The technical skills came almost unnoticed with pedagogical reform. A wide variety of training was given during the project and all the teachers involved had an opportunity to take part in the training they required, either at their own school or on courses arranged outside. Nevertheless, each teacher was ultimately responsible for developing his or her ICT skills. This meant that those teachers involved were able to develop their own preferred practices. (Ilomäki 1999, 70)

3.1.2. Teacher training in IT project

In Finland, particular attention has been given to information and communication technology because education and learning are considered to be the “right road” to creating an information society. Information and communication technology development has given priority to providing everyone with ICT skills. In practice, this means basic technical training for teachers and principals and, at a later stage, concentrating on pedagogical and subject-related training. Teachers’ skills are considered as playing a key role in creating the information society. This is why their training in particular is supported and efforts are made to develop both technical and pedagogical support. (Ilomäki & Rahikainen 2001, 25-26)

Even though the majority of teachers can already use ICT, also in their own work, they don’t necessarily have a chance to use it in their own teaching (Ilomäki & Rahikainen 2001, 29). Despite a growing amount of hardware, the shortage of computers to which teachers, in particular, have access greatly prevents the increased use of information and communication technology in teaching. In 1999, teachers considered the lack of pedagogically interesting software and uncertainty as to how to use ICT in teaching to be other factors limiting the use of information and communication technology in teaching (Ilomäki, Tapola, Hakkarainen, Koivisto, Lakkala & Lehtinen 2001, 32).

The need for pedagogical support has become one of the principal needs for support in schools. This can be considered extremely encouraging: there is an interest in using information and communication technology in teaching and teachers generally have a positive attitude to the development of information and communication technology (Ilomäki, Laine, Syri, Lallimo, Rahikainen, Lakkala, Hakkarainen, Lipponen, Muukkonen & Lehtinen 1999). Nevertheless, it transpired during the IT project that, for instance, the idea of a teacher responsible for pedagogical support may not work, not because of lack of interests, but because support persons don’t have the time to get involved in solving pedagogical problems as well as technical ones (Ilomäki, et al. 1999, 82). It would be a good idea to link training aimed at developing pedagogical operating models with training in computer skills so that teachers themselves can design teaching schemes where there is a genuine need to use ICT (Ilomäki 1999, 10).

3.1.3. Teacher training needs

Many information and communication technology development projects are driven by so-called early adopters. In other words teachers that have learned how to use ICT earlier than others, and can thus use it better than average, are more likely to introduce it. Information and communication technology changes the teaching of these teachers in the sense that they detach themselves from text books and lecture content, become more in favour of peer working and employ collaborative and teamwork methods more than other teachers do (Ilomäki 1999, 11-12).

Teaching development calls for abundant training and support – as well as motivation and courage on the part of the teacher to assess his or her own work. Wherever possible, it is best to train teachers in information and communication technology using the school’s own computers. Nevertheless, outside training provides an opportunity for teachers to forge

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contacts and to share ideas with others. It is a good idea to try and arrange training during school hours if substitute teachers can be arranged without making too many demands on the school and teacher (Ilomäki 1999, 121-123).

IT support arrangements also play a major role in information and communication technology development projects. Efforts should be made to arrange adequate expert support staff for schools throughout the duration of a project. However, schools should have a chance to decide how support arrangements are made (Ilomäki 1999, 121-123).

Aside from technical skills, the differences between teacher and pupil ICT competence, the need for teachers to have a new kind of pedagogical excellence and pressure to develop collaborative working to improve the use of information and communication technology are new challenges arising in developing information and communication technology for teaching purposes. In other words, teachers still need support to be able to meaningfully use ICT in their teaching. Nevertheless, it should be borne in mind that the need for support still varies greatly. This means that besides multiform, flexible training, most teachers in the school still require small training events, shared support and individual guidance (Ilomäki et al. 1999, 81-84).

IT project training and support can well be regarded as a major factor in improving teachers information and communication technology skills because during the project, the need for teacher training diminished and there was greater satisfaction both with pedagogical and technical support. Nevertheless, it should be noted that training and pedagogical support (models, experimental teaching, etc.) in the use of information and communication technology are still required. This is because many teachers consider the uncertainty as to how to use ICT in their teaching an increasingly important factor preventing them from increasing use of information and communication technology (Ilomäki, et al. 2001, 39).

3.2. Experiences gained from the Helsinki Virtual Webschool project

The Helsinki Virtual Webschool project was funded by the National Board of Education to develop web-based teaching and learning by Helsinki City Education Department's Media Centre. The Helsinki Virtual Webschool project lasted three years (1997-2000). The project aimed to build a model for studying, learning and teaching that takes place in different network environments, to generate a teacher training's pedagogical, technical and administrative operations model. The Helsinki Virtual Webschool project was a concept comprising web application, research, training paths for teachers and pedagogical consulting taking place in schools, an administrative virtual school project and both national and international cooperation. To achieve the aims, project tasks were split between two different groups - project group and training and consulting group - as follows. The project group was tasked with monitoring activities in schools and using the experiences obtained in building and further developing a web application. The training and consulting group was tasked with building a training and guidance model for teachers based on the experiences gained of the pilot stage (autumn 1999). (Korhonen 2001, 56)

3.2.1. Planning stage

Work began on planning the Helsinki Virtual Webschool project in December 1997 by compiling research findings and earlier experiences of learning and teaching in web-based learning environments. The planning stage had the following aims: to chart user needs, to create a pedagogical set of criteria for the web application and to build a demo version. The pilot stage using a demo version was launched in spring 1998. Project planning and development were shaped by the pedagogical ideas of Helsinki City Education Department's IT project research team, research and experiences of CSILE projects, the Etäpulpetti project and other experiences gained in international projects. The planning stage also included a demo version based on the web application. This was tested and improved during the year. In spring 1999, it was decided to build a working model of the demo version. After many modifications, the working model was deployed in the pilot stage of the Helsinki Virtual Webschool project in autumn the same year. (Hakkarainen et al. 2000, 22; Korhonen 2001, 56)

3.2.2. Pilot stage

The pilot stage of the Helsinki Virtual Webschool lasted the autumn term of 1999 and aimed to gather information about the technical functionality of the web application in problem-based learning methods. The pilot stage saw the first pilot teachers trying out the Helsinki Virtual Webschool web application in practice in their own teaching. Pilot teachers were chosen from different levels of teaching and from slightly different schools and had a various range of ICT skills. The pilot teachers had earlier tested the Helsinki Virtual Webschool's demo version during the spring term of 1999. The idea behind the pilot stage was to systematically gain experience of the technical functionality and suitability of the web application in problem-based learning methods. (Hakkarainen ym. 2000, 24)

Training was provided for the pilot teachers in autumn 1999. Although the actual training content wasn't finalised, the training days were earmarked in early autumn. A training analyst monitored the training process and developed training content in line with the

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wishes of the pilot teachers. For example, the topic "assessment" was one such subject pilot teachers wanted to cover. Training content developed as the teachers' technical training became less and the workshops started to discuss about content relating to the new learning concept and the network environment.

Training content became more precise during the training process. Here are presented the most initial training contents:

- technical skills for operating Helsinki Virtual Webschool application
- problem-based learning and progressive inquiry model
- interaction and support in a web-based learning environment
- collaborative knowledge building
- assessment in web-based learning environment
- teacher support in carrying out a learning project

Initially, all pilot teachers were given two days' training in the use of the web application. Additionally, one-day workshops were held at intervals of about three weeks during autumn 1999. In the workshops, teachers presented their learning projects, brushed-up on how to use web application in teaching and gave development comments to the project group. Other experts on various topics were also heard in the workshops.

Important tool in training was the frank exchange of teachers' experiences and an opportunity to discuss problem spots in web-based teaching. In this respect, training differed from more traditional ICT courses, which seek to provide basic ICT skills. It should also be noted that teachers were willing to discuss the difficulty and amount of work involved in changing teaching methods. Moreover, tutorial pupils acted as support in teacher training by helping teachers deploy the technology.

The web application was still very much under development when the pilot stage got underway in autumn 1999. There was insufficient consulting for pilot teachers at the training sessions. This meant that teachers had difficulties in starting learning projects with their pupils. Many teachers also gave up projects and training because the user interface was still under development. The trainers had discussions with these teachers and received criticism and suggestions as to how the web application could be improved. The experiences obtained with this group gave invaluable information with a view to building spring training programme and improving the web application. Amongst other things, it showed the need for guidance in the classroom itself and the fact that teachers demanded a straightforward, user-friendly user interface. (Hakkarainen et al. 2000, 43)

Some teachers were surprised at just how much planning and preparation the learning project required in advance. It was not enough just to compile material. Teachers also had to outline the learning project into a practical concept. Joint planning of learning projects and teaching situations were of major importance to teachers. Teachers sought confirmation and support for their own solutions from both other teachers and trainers. Teachers made an effort to respond to the challenge by being present during lessons and at workshops.

Once the learning projects were under way, consulting provided practical support for teachers and pupils in technical issues relating to the learning environment and pedagogical instruction on how to use Helsinki Virtual Webschool tools. Experiences

gained during consulting were useful to both parties because the most important tasks during the pilot stage included collecting information about the functionality of the Helsinki Virtual Webschool web application in various teaching situations, obtaining constant feedback about its good and bad points as regards functionality and flexibility. Consulting helped ensure feedback was passed on quickly and facilitated improvements to the environment. Points were not just noted down, but any modifications were made immediately. This was in the interests of all users.

3.2.3. New training model and web application Mauri

Experiences gained during the pilot stage led to improvements being made to both the Helsinki Virtual Webschool web application and to the teacher training model. February 2000 saw the start of testing and use in teaching of a new teaching and learning environment, Mauri (<http://mauri.edu.hel.fi>). Mauri's functions were increasingly aimed at supporting progressive inquiry teaching method.

Those pilot teachers who had been involved in the project in autumn 1999 were now adequately equipped to become leaders during the training periods in spring 2000. They served as instructors of their own groups together with trainers from the City of Helsinki Education Department's Media Centre. Four training sessions were held in spring 2000 with Helsinki Virtual Webschool serving as the learning environment. There were places for sixteen teachers in each group. Training was given six times during the following few days. Training content was as follows:

- Days 1 and 2 Technical usage of the web application and web-based teaching.
- Day 3 Progressive inquiry method.
- Day 4 Workshop: practical experiences.
- Day 5 Guiding and supporting interaction in web-based learning environment.
- Day 6 Assessment in web-based learning environment.

During training, teachers received both theoretical information about and practical experience of web-based education. An essential part of the training programme involved teachers using the progressive inquiry method to implement a learning project with their class in the Mauri learning environment. In addition to training days, teachers who started to use the Mauri learning environment in their own teaching were also offered telephone and email support and consulting support for the classroom situation itself. Teachers could contact either trainers or the instructor, the 1999 pilot teacher, of their own group. (Hakkarainen et al. 2000, 61-62)

3.2.4. Benefit of the Helsinki Virtual Webschool project from the aspect of teacher training

The success of the Helsinki Virtual Webschool project resulted in new working methods being introduced in areas of teacher in-service training and consulting. Consulting enabled guidance and support functions to be brought direct to schools, where working took place between teachers and pupils during lessons. Guided planning in advance - during the training - enabled help to be given to teachers in various solutions to pedagogical and technical questions arising in the use of Mauri. The solutions to problems varied depending on the extent of the learning project. All possible help, both pedagogical and technical alike, that could be provided during the learning projects was considered important. In the long run, splitting up the training made it possible to test various learning solutions in the web. As training continued, teachers were able to be in continuous contact with the instructor of their own group or Media Centre trainers, who provided help by email, phone or by visiting the school. (Hakkarainen et al. 2000, 64)

3.3. Safer Use of Internet -project

The Media Centre participated into the Safer Use of Internet -project during 2000-2001. This one-year-project was a project of The Awareness for a Safer Use of Internet -programme of IST. The aim of project was to promote discussion and communications among teachers, pupils and parents regarding the safe and responsible use of the Internet at schools.

One of the main actions of the project was to collaborate with teachers and also the parents how to use the Internet in teaching and in education pedagogically meaningfully. In addition to the basic courses several lectures and open discussions, workshop seminars and lectures were organised in the Media Centre on the matter. Other main action of the project was to disseminate information about the advantages and disadvantages of the Internet as well information about how to act in critical situations, as when an underage child has come into contact with harmful or illegal Internet contents.

The special goal of the Safer Use of Internet project in Media Centre was to support the piloting teachers chosen in their professional development. The piloting teachers were also encouraged to act as co-trainers and consultants in the project. They organised special teacher seminars and workshops for their colleagues and for their pupils' parents in their schools to handle the issue.

Pilot teachers expressed a wish to have pedagogical material on topical questions on using Internet at schools – also the trainers and project planners from the Media Centre had an initiative to develop practical and pedagogical material to promote during their Internet courses. The piloting teachers and the Media Centre trainers planned together a Teacher's Folder for use as study material in the schools, with 14 topics on the responsible use of Internet at school. The folder contained topics on which the teachers attending the planning stage wished to have more information or which the pilot schools considered particularly challenging, including for example Web site assessment, copyrights in the Net, data security and data privacy and the special questions to be taken up in parent-teacher meetings. In addition to teachers' sections, the material contains pupils' exercises. The folder was distributed to all primary and secondary schools of Helsinki (Haatainen 2001).

3.3.1. Teachers' experiences on Safer Use of Internet -project

The role of the teachers turned to be very important in this project; they seemed to empower the awareness for a safer use of Internet at schools and in their reference groups and acting as an informative and interactive link to the homes of the pupils. Anyhow there was not so many parents taking part into the seminars that teachers expected. One reason could be, that parent are not so familiar with new technology and it's benefits and hazards that education staff considers (Haatainen 2001).

It seemed very effective, that the piloting teachers, the early adopters, both planned and promoted the pedagogical material and training on safer use of Internet to their reference groups, other teachers. According the general feedback schools of Helsinki have adopted the material actively for their use. Also other cities and counties in Finland have been interested in material. The piloting teachers themselves used and evaluated the material

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when they concentrated intensively on safer use of Internet in their teaching during the spring term 2001. (Haatainen 2001; Uusitalo 2001)

The teachers at schools participating in the Safer Use of Internet project were each requested to give a progress report at the end of the project. The responses obtained from teachers emphasised the need for pedagogical support and clear-cut curriculum guidelines, although technical training and support was also considered necessary. In general, the Internet is perceived as important aspect of learning and information search, with a variety of applications. On the other hand, the multitude of applications may also become distressing for the teacher; supportive measures should therefore be available on an everyday working level. Another issue that emerged from the reports was a desire to include guidance in using computers and the Internet as pedagogically meaningful teaching aids as early on as at the teacher training level. (Uusitalo 2001)

Teachers were requested to include in their final reports any suggestions and ideas they might have on how the education authority could in future encourage teachers to explore the subject. Some ideas were in fact obtained, and several teachers hoped that the procedures developed during the project be continued. A number of reports raised the issue of further training for teachers, with as emphasis on regular local pedagogical and technical training and support. (Uusitalo 2001)

3.4. Perspectives for the ITCOLE teacher training and consulting

In this chapter the summary is compiled from the previous experiences of teachers and trainers of the Media Centre and a research in connection with various projects. The experiences and perspectives highlighted are considered crucial starting points for planning the supporting activities in ITCOLE project and planning the ITCOLE teacher training and consulting model in general.

3.4.1. Combining technical and pedagogical training

The IT project, Helsinki Virtual Webschool project and some other development projects in Media Centre like the Safer Use of Internet project showed that teachers considered them as a positive move to combine ICT and pedagogical training. Further ICT training for teachers should seek to combine the learning of technical ICT skills and the pedagogical application of ICT. Finnish teachers considered the need for pedagogical support to be important. This in turn tells that they already have certain basic ICT skills but that they need outside help in applying them to teaching. Teachers that hadn't used ICT as a teaching aid considered their own skills to be inadequate. Nevertheless, irrespective of the starting level of teachers' ICT skills, training should always combine the teaching of technical skills with a collaborative reflection of the pedagogical methods or ways of working that can be used to apply the skills learned to a teacher's own teaching.

3.4.2. Consulting

In the Helsinki Virtual Webschool project, teachers considered consulting with Media Centre trainers to be important because the trainers were accessible by phone during school hours and, whenever possible, also came to lessons. In the Helsinki Virtual Webschool project, teachers thought that the direct support of trainers was extremely important and vital for the success of learning projects both during the planning stage of learning projects and during the implementation stage (Hakkarainen et al. 2000). Teachers taking part in the SUI project also required technical and pedagogical support when a problem arose in class (Uusitalo 2001). Aside from training, consulting also plays a core role in the ITCOLE -project training and consulting model, both before starting and during the learning projects.

Generally speaking, teachers considered it desirable to provide support as close as possible to everyday school life (Hakkarainen et al. 2000, Uusitalo 2001). It is easier for teachers, both mentally and physically, to take part in training at their own school. After training, it is also slightly easier to use their own school's computer classroom in teaching since the hardware and the software are already familiar. On the other hand, training outside the school also means teachers can forge contacts with other teachers and create teacher networks. Peer teachers are again considered an important support both in improving one's own teaching and in facing any resistance to change. When thinking about teacher (early adopter) training in the ITCOLE -project, which aims at improving the use of ICT in teaching, training would ideally be held for pilot teachers outside their school and consulting would - as far as possible - take place in each pilot teacher's own school. The IT project noted that it does not make sense to use teachers responsible for ICT as pedagogical support staff because support staff have neither the time to nor necessarily

the interest in arranging pedagogical support (Ilomäki et al. 1999, 82). On the other hand, the use of early adopters or pilot teachers as support staff proved to be a good method in both the SUI and Helsinki Virtual Webschool projects because pilot teachers have personal experience of implementing ICT in teaching and of facing resistance to change in schools. The help and support of an experienced pilot teacher of this kind is important for teachers just beginning to implement ICT in their teaching.

3.4.3. Opportunities for teachers to use ICT

Teachers hope that after training, they will be allowed time for practice and personal guidance so that they can get hands-on experience of what they have learned and ask for advice if required. This was found to be a practical solution also in the Helsinki Virtual Webschool project, where teachers were trained to produce their own projects in special workshops (Hakkarainen et al 2000).

The last challenge facing teachers are the computers themselves (Ilomäki et al. 2001, 32). The fact that there are not enough computers for teachers to enable them to study and develop their own skills and to think about the use of ICT in teaching is a major restriction. More computers should be made available firstly to teachers themselves and secondly for implementing ICT flexibly in teaching.

Before teachers begin to implement ICT in teaching they need to improve their own skills. In order to improve teachers' ICT skills teachers need adequate training and computers reserved only to the use of teachers.

The problem in implementing ICT in teaching of varying subjects is that the computers intended for pupil use tend to be in a particular classroom. This means the use of ICT is strictly limited to a certain time and place. When planning implementing Synergeia learning environment attention should be paid to positioning hardware and network connections in schools. Computers have traditionally been used in schools to teach ICT, which is taught as a separate subject. This means computers are located in a classroom of their own and the only teacher to use them is the ICT teacher. Computer location has been a problem as increasing numbers of teachers want to use ICT in other subjects. If the computers are in one classroom only, there are problems in making timetables to keep everybody happy. One lesson generally seems to be insufficient for long-term work in ICT class. Computers should therefore also be placed in other classrooms to enable information and communication technology to be used as extensively as possible. For example, putting a few computers in each classroom would ensure teachers have an opportunity to use ICT as a teaching aid and in teaching specialisation. Teachers who have a computer in their own classroom make greater use of information and communication technology than those without a computer (Hakkarainen 1998; see also Korhonen 2001).

As advances are made in technology, schools will also be able to locate their computers more flexibly. For example, a mobile network and laptop computers could be a practical and flexible solution in teaching that encourages teachers to make more use of ICT as a teaching aid (Ilomäki 1999). These types of solutions are still quite new in schools and require special arrangements to make them work.

3.4.4. Training in change management

It should be pointed out that it is the early adopters - teachers who had previously already used ICT - that have applied to take part in development projects in the use of ICT in teaching (e.g. Ilomäki 1999, 11-12; Hakkarainen et al. 2000, 33). These teachers have considered it necessary to implement information and communication technology in teaching and have implemented to be involved in various development projects in the use of ICT in teaching. Early adopters should, together, summon up the courage to innovate various teaching schemes and to network with other teachers interested in using ICT in teaching. Additionally, teachers should summon up the courage to consider how they could deal with any resistance to change from other teachers.

It is quite common for teachers to adopt a negative attitude to the use of information and communication technology in teaching. Experience shows that many pilot teachers have wished for guidance on how to face resistance to change in their own schools and training at the basic training stage for all teachers on how to deal with prejudice (Uusitalo 2001). Often, negative attitudes to the use of information and communication technology in teaching are result of a lack of ICT skills and information. The ITCOLE training and consulting model sought to get pilot teachers to continue as assistant trainers and pedagogical consultants during the project. The role of pilot teachers as agents facing resistance to change is predicted through change management training.

4. ITCOLE teacher training and consulting model

The objective of ITCOLE teacher training and consulting model is to promote pedagogical models and good pedagogical practices on collaborative, problem-centred learning, such as progressive inquiry, and to disseminate the Synergeia learning environment, which supports them. The teacher training and consulting model empowers also the change of the teaching and learning culture in European schools.

4.1. Starting points for the ITCOLE teacher training and consulting model

Any examination of the teacher training and consulting model should bear in mind that though the training model was built mainly on the previous experiences of Finnish teachers and research work carried out in Finland, the model can be relocated and modified to different countries and cultures. Also the experiences and conclusions of international ITCOLE partners on first and second test phases of ITCOLE -project have had a remarkable impact on planning training model. Because the training and consulting model is part of a development project and itself a development process, it is important to understand that there are many ways of implementing it. The development process should take into account the starting point of the trainers and teachers taking part, the aims of the development process and only then determine the means and ways through which efforts are made to achieve the aims. The ITCOLE planning team of Helsinki City would like to emphasise that the general model presented in this chapter has been created for implementing in teacher training organisations, in centres that have resources and time to carry out the training and have practical links to schools. The training organisers and persons implementing the model set out on the basis of their own pedagogical principles and aims of their development process within the limits enabled by their training systems. Through this model it is wished to transmit the skills, experience and vision of teacher training and the support of development projects that arose during many years of development projects and basic teacher training in ICT skills in Helsinki.

4.1.1. The structure of the teacher training and consulting model

The teacher training and consulting model is shown in a diagram in chapter 4.3. The diagram is in cycle form. The cycle form is intended to highlight the developmental process nature of the training model and the development process and revision of the teachers, schools and trainers taking part during the entire two-year ITCOLE -project. The training model cycle is implemented twice during the two-year project. The first training process particularly emphasises assessment and development work of the Synergeia learning environment and pedagogical practices. During the second training process, the Synergeia learning environment is deployed at the very start of training. This changes the form and content of training.

Two parallel levels have been drawn for the training and consulting model: ITCOLE -project trainers are depicted outside the cycle and teachers and schools taking part inside the cycle. This double structure particularly seeks to highlight the interaction of researchers, trainers, teachers and schools and their collaborative role in the development process. Teachers are not only technically trained to use the Synergeia learning environment and pedagogical method for progressive inquiry. In addition to technical

ability, training also seeks to provide teachers with an ability to develop the Synergeia learning environment and to implement and develop the best pedagogical practices together with trainers and researchers.

The training and consulting model seeks to point out that the training process must be seen as part of a broader effort to develop the use of information and communication technology in teaching, support a change in teaching and learning culture in the school and to deal more extensively with the professional development of teachers. The training and consulting model is dynamic and changing. For example, research work done in the ITCOLE -project and its findings will affect future training. The training and consulting model is also assessed during the process and amended and improved on the basis of feedback received. For this reason, the model appearing in April 2002 can only be considered as being indicative.

4.1.2. The teacher training and consulting model as a development process

The training and consulting model cannot be seen just as a learning process but also as a development process in itself just like the software and pedagogical models and the assessment instruments of the ITCOLE -project (Molenaar, Kraan & Sligte 2001, 7-8). Typical stages in the development process are: 1) Preliminary and background work, 2) Launch, 3) Process execution and coordination and 4) Conclusion and assessment. The stages of development in the training and consulting model appear as follows: preliminary and background work includes the choice of pilot teachers, notifying both principals and schools as part of orientation training. In practice, the preliminary background work and launch, stages 1 and 2, partly overlap. Thus teachers taking part are directed to prepare for development work, outline the development area in full and determine shared concepts. Additionally, a preliminary action plan and cooperation agreement are made for the process. Orientation training itself promotes the launching stage of the development process. The Action stage, in other words implementation of learning projects in schools and consulting, represents the execution and control stage of the development process. In the training and consulting model the Assessment stage is divided into the following stages: Assessment and reflection stage and Dissemination stage.

The preliminary background work and launch and orientation training in the ITCOLE -project are an important part of the development process. Generally, all those matters remaining unclear at the beginning reappear during the conclusion stage. Initially, it is important to conclude a cooperation agreement, define the forms of cooperation, the participants, contact tools and methods and, for example, joint training days. It is also important to strive for confidence and genuine reform and learning, as well to reflect on the type of work prepared for the development process.

Preparation for the development process as regards the school and teaching includes discussion and agreeing on shared concepts, in this case especially the importance of based on the Synergeia learning environment and progressive inquiry in teaching and in the school. Supporting the change needs long-term commitment on school level.

Here, the training and consulting model has, as far as possible, sought to take into account the hopes and aims of the Helsinki teachers taking part. It would be excellent if those implementing the model also had a chance to revise and develop the training model in line with the starting points of those teachers and schools taking part in training. If the training and consulting model is implemented in the same way as it was in Helsinki, so that the pilot teachers in the first stage later act as trainers, particular attention must be given to the choice of teachers. The body responsible for training should find the best qualified and motivated teachers from different grades who are able to tolerate the uncertainty typical of the development process, unforeseen changes and resistance to change. Teachers should also be genuinely interested in development work and be professional and bold enough to investigate and assess new pedagogical innovations for which there are, as yet, no established routines and proven practices to resort to.

4.1.3. The dual model in virtual teacher training

The dual model in virtual teaching (Enkenberg & Laaksonen 2000, 6) was chosen the basis for training and consulting model. The idea behind the dual model is to teach both in the traditional way and virtually. According to Enkenberg and Laaksonen (2000, 6), the benefit of the dual model is that many different types of teaching methods and models can be applied to it unlike virtual teaching, which has been entirely transferred to the web. The virtual learning environment adds diversity to and complements traditional teaching. In dual model more teaching resources (teaching materials, teachers) can be flexibly drawn upon as required.

The use of the dual model as a basis for teacher training can, especially in the first stage of the ITCOLE -project was, the contribution of the teachers taking part in planning the training. Similarly, the experience of the Media Centre of Helsinki City Education Department as a teacher trainer has shown that a virtual environment on its own is insufficient to generate collaboration and goal awareness in learning.

4.2. The teacher training stages

The ITCOLE -project training and consulting model is divided into four stages each closely linked to the other. The model stages are 1) Orientation stage, 2) Action stage, 3) Assessment and reflection stage and 4) Dissemination stage. Training is emphasised on the first stage of the model and consulting on the second. Training in the third and fourth stages is mostly in the form of preparatory training in the previous stages.

The function of training is different in the various stages of the ITCOLE -project. Orientation training focuses on preparation for future learning projects and assessing the usability of the Synergeia learning environment. Orientation training is closely connected with the field test phases one and two. The goal of the testing phase one "...is to explore the pedagogical models and independent tools that will be integrated in the ITCOLE environment in collaboration with teachers" (Molenaar et al. 2001, p.16). The first field testing phase is included in the orientation training stage and professional development. The orientation training is all so connected to field test phase two, when the A version of the Synergeia learning environment is to be tested within the school environment

(Molenaar et al. 2001, 18-19). In orientation training the common concepts of CSCL and of web-based learning environments are explored and determined and the teachers are given tools and methods to evaluate pedagogical and technical usability of web-based learning environments. Training during the orientation stage is built on expert platforms and by presentations of earlier experiences using examples and on the topics arising in discussions between all those taking part. The most important contents of the orientation training are pedagogical models of CSCL, the technical and pedagogical use of Synergeia learning environment and the concepts of CSCL.

Training during the action stage focuses on supporting learning projects implemented, integrating theoretical knowledge with teachers' own experiences of learning projects and generating discussion. Efforts are made to support the implementation of learning projects with the help of consulting and pedagogical workshops.

Training in the assessment and reflection stage partly takes place in the form of preparatory training (e.g. User interface analysis and User's Stories assessment method training) in the orientation training stage. However, a closing seminar is organised in the assessment and reflection stage. This seminar seeks to support teachers in assessment work and to prepare them for the dissemination stage.

There are no actual training days during the dissemination stage of the ITCOLE -project training and consulting model, because training in this final stage takes place in all the previous stages in the form of preparatory training and the ITCOLE dissemination strategy will be planned in detail at the end of the project. The dissemination will be reflected in detail in chapter five. The various stages of the training and consulting model are presented in more detail under following subheadings.

4.2.1. Orientation stage

The idea of orientation training is to primarily offer teachers pedagogical training to learn about pedagogical approaches of CSCL, like the progressive inquiry, at both the theoretical level and using practical examples. Additionally, pedagogical training discusses web-based learning and instruction and assessment in a web-based learning environment. The orientation training provides technical training to teachers how to use the Synergeia learning environment and discusses how the process of collaborative learning and knowledge-building, teacher guidance and assessment are implemented in the Synergeia learning environment. The orientation training can be considered as including process management training, where tools are given to teachers to manage and coordinate learning projects to be implemented, to network with peer teachers, to face resistance to change and to execute their own professional and the entire school's development project. It should be noted that even though training in this training and consulting model is examined from the pedagogical, technical, project planning and process management training aspects, in practice they overlap each other. Based on research and the earlier experiences of teachers (Hakkarainen, et al. 2000; Ilomäki 1999; Uusitalo 2001), combining pedagogical and technical training is the best way to approach further ICT training for teachers. All the various aspects should be parallel and overlapping themes in all training, even though the main focus alternates between them. At best, pedagogical, technical and process management aspects come together in Synergeia software training

and, in the action stage, in pedagogical workshops, where teachers and trainers plan and produce actual collaborative learning projects for the Synergeia learning environment.

Skills for process management

The theme throughout orientation training is to provide teachers with the tools to manage both their own teaching and the entire ITCOLE -project development process. An awareness of the various stages of the development process is called for if productive, quality progress is to be made with development projects such as the ITCOLE -project. During the first stage of the ITCOLE -project, teachers not only commit themselves to developing their own teaching but also to improving Synergeia and assessing pedagogical practices. Teachers also require strategic planning tools to plan and carry out, draw conclusions to and assess a long-term development project. From the teacher's point of view, it is essential that development process competence can also be implemented to his or her own teaching and that feasible learning projects can be implemented on that basis. This is why in training teachers to use the Synergeia learning environment it is also important to provide basic information and concepts about project management and strategic planning for future learning projects. Only a sufficiently careful, concrete plan can result in a productive learning project.

Networking and interaction

Progressive inquiry, intuitive thought and critical reflection are required if a teacher is to continuously develop professionally. An awareness of the principles of the learning organisation, has reinforced the idea that quality of action is able to be developed more when teachers work as a group than when a teacher works alone. Consequently another important theme pervading ITCOLE teacher training is to promote networking and to launch discussion between teachers taking part in the ITCOLE -project.

The training and consulting model highlights the collaboration of the teachers taking part. Opportunities for critical discussion will be organised in both pedagogical workshops and later in the virtual workshop in Synergeia. Change will be brought about by collective force. Nevertheless, discussions together does not mean that each member of the group defends his or her own viewpoint, but that teacher training should support a group dialogue and collaborative knowledge building that also enables members to detach themselves from their own previous assumptions and to commit themselves to a new understanding. Only raising the level of awareness and critical examination of assumptions can lead to a process of change in the educational community (Koli & Kylämä 2000). It is that vital teacher training in the ITCOLE -project takes this into account. A trainer with adequate professional competence should guide teachers to reflective dialogue, to conceptualising and forming their own experiences, to open information sharing and raising joint awareness. This is why the training model highlights discussion, meetings and collaboration between teachers.

The many years experience of Media Centre of Helsinki City Education Department teacher trainers shows that progressive inquiry and collaborative discussion, knowledge building and reflection in a confidential atmosphere, which also includes intuitive and real-life knowledge, as well as tacit knowledge are required to raise the joint awareness of teachers taking part in the project. This is why, particularly in the early stage, training

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highlights actual meetings between teachers and trainers in accordance with the dual model. The amount of virtual training increases in the action and assessment and reflection stages as learning projects progress, when enough collaborative experience has occurred and the teacher community has bonded into a group.

Readiness to face resistance to change

A development project such as the ITCOLE -project nearly always generates resistance to change. This is quite a normal and an acceptable part of human reactions and professional activities. Nevertheless, commitment and being committed call for dealing with these factors resisting change since they direct peoples' energy against rather than for development. Resistance to change might, for example, be owing to the frustration caused by earlier projects that remained unfinished, poorly organised projects or development projects where there was insufficient competence to carry them out. Pressure and huge workloads also cause resistance to change; there is always a temporary increase in work volume in situations of change (Koli & Kylämä 2000). This is why ITCOLE -project orientation training seeks to provide an opportunity to deal with resistance to change and related phenomena. An awareness of resistance to change and preparation to face it in one's own school particularly relates to the role of pilot teachers in the first stage of the ITCOLE -project as future trainers and promoters of learning environment.

Joint concepts facilitate work

For a school, learning and development in an educational community is always a strategic choice. No school or learning culture is permanent, but is constantly being made and recast by the people working there. In developing the use of information and communication technology in teaching, it is important to find a common language and joint concepts that can be used to enable collaboration and actions relating to a common aim. Concepts in information and communication technology are still very much taking shape and vary. Because of its international nature, this is particularly challenging in the ITCOLE -project. The body arranging training in each country taking part naturally needs to define its own training and support actions, but also common, mother-tongue concepts for teachers and pupils.

Time for preparation

The Orientation training can last for a few months so that teachers have time to learn about the development project, reflect what they've learnt, build knowledge on joint concepts together with other teachers and trainers and think about what kind of learning projects each teacher wants to implement. Before starting an actual learning project, it's a good idea to organise a joint pedagogical workshop where teachers together can build knowledge on the advantages and disadvantages of the Synergeia learning environment and think about teacher guiding strategies in learning process. It would also be a good idea if the pedagogical workshop gave teachers time to collaboratively process their learning projects and left time for spontaneous questions and discussion.

4.2.2. Action stage

Sensible, extensive use of information and communication technology in teaching in schools requires not just the support of the school head. Teachers are also required to have adequate technical and pedagogical skills, in other words they need continuous consulting. As teaching and learning shifts via computers to the web, teachers need more pedagogical and technical support, especially during the implementing stage. Support must be readily available if teaching is to be successful. If network connections or computers fail to work or teaching arrangements fail, a teacher starting web-based teaching is more likely to revert to traditional teaching. Successfully introducing computer supported collaborative learning in every day school life calls for teacher support in the change. Synergeia learning environment training must ensure that teachers get adequate pedagogical and technical consulting. The organisation arranging training must check to see whether there are enough pedagogical and technical consultants available for use by schools and whether they have the time to be responsible for schools' present and future needs.

Arranging adequate pedagogical and technical consulting

In the ITCOLE teacher training and consulting model a pedagogical consultant is an expert on the use of information and communication technology in teaching and web-based learning. The pedagogical consultant helps, supports and guides teachers in implementing and developing collaborative learning supported by Synergeia learning environment. A technical consultant on the other hand is an expert who helps, supports and guides teachers in technical matters and ensures that computers, peripheral equipment and web links are in working order.

There should be a named pedagogical consultant appointed for each teacher to follow and guide how the collaborative learning project is progressing, be in contact with the teacher by phone and email and visit the school during lessons to guide the teacher in technical and pedagogical problems. One consultant can be responsible for several teachers. A consultant is responsible for acting as if he or she were the teacher's colleague, with whom the teacher can discuss benefits and hazards relating to implementing a learning project. A consultant does not need to know the answers to problems: he or she participates to the collaborative learning process with teacher as a co-learner. His or her role is to make supportive and guiding questions and encourage the teacher to make his or her own personal solutions in teaching. Neither does a consultant need to know the solution to all technical problems, but to serve as a link to technical support proper. The technical support is reflected more in next chapter.

The aim of the Media Centre of Helsinki City Education Department is that as the ITCOLE -project progresses to the third testing phase in Autumn 2002, the first pilot teachers will become pedagogical consultants supporting new teachers. The training body's own trainers committed to the ITCOLE -project are, however, required to solve technical and acute problems, pedagogical teacher support and to arrange orientation training.

Pedagogical workshops

The pedagogical workshops will be organised for teachers in Action stage, when a start is made on implementing the learning projects. In the pedagogical workshops, teachers can plan, perfect and show each other their own learning projects and receive technical and pedagogical help from trainers and, perhaps most important of all, talk about web-based teaching and their experiences with peer teachers and trainers. Earlier experiences of the Media Centre of Helsinki City Education Department show that teachers consider this kind of informal pedagogical workshop to be important to the success of learning projects.

If teachers wish, web-based teaching experts can be invited to the pedagogical workshops to initiate discussion. It's a good idea to organise pedagogical workshops in a computer classroom so that teachers really have a chance to work on their own projects also in the Synergeia learning environment. The main focus in pedagogical workshops should be on the teacher's own working. Teachers should be allowed plenty of time for working and there should be adequate trainers available in the workshop to help teachers.

Virtual workshops and knowledge building

Earlier was mentioned that teacher training is organised in line with the dual model. The dual model doesn't become actual until the action stage, when, in addition to pedagogical workshops, a shared knowledge building area is arranged for teachers in Synergeia learning environment and two virtual workshops are organised. Teachers can present questions occupying their mind in this shared knowledge building area. Trainers and teachers then discuss solutions to pedagogical and technical problems using collaborative knowledge building. During the action stage, problems and possible solutions to them accrue in the knowledge building area. Teachers can seek confirmation for pedagogical solutions in the knowledge building area or ask how other teachers have arranged teaching in Synergeia environment, etc. One trainer will be appointed to be responsible for knowledge building. He or she will be tasked with ensuring that all questions are answered. One advantage of a shared knowledge building area is that teachers can continuously interact with other teachers and trainers irrespective of time and place.

Each teacher brings his or her own learning project plan to the Synergeia learning environment so that other teachers can reflect it. All documents relating to joint training are also brought to the environment at the same time. Examination of these documents is voluntary. Teachers shouldn't be overloaded with long, complex knowledge building processes during the action stage because carrying out learning projects is already a tough process. However, interaction in the knowledge building area is too slow to respond to a teacher's need for rapid help. Interaction during the action stage takes place between teacher and trainer through consulting, which has been found to be the most important form of support in development projects (Hakkarainen et al. 2000).

In addition to the shared knowledge building area, problem-centred virtual workshops can be arranged in Synergeia learning environment in the Action stage. In Helsinki during the second test phase teacher training the virtual workshop subjects are following: 1) Teachers guiding methods in the progressive inquiry process on the web and in the classroom and 2) Resistance to change and how to face it. The virtual workshops will be

initialised first with an article relating to the subject and then collaborative knowledge building about it by the knowledge building area. Also the experts from University of Art and Design as well as Project Research Group from the University of Helsinki will participate in the workshops.

Use of virtual workshops in teacher training can be justified on the grounds of the benefits brought about by learning in a web-based learning environment (flexibility as regards time and place, support for knowledge building) and learning about the actual Synergeia learning environment. A collaborative knowledge building area and virtual workshops give teachers a chance to gain valuable hands-on experience of using of a web-based learning environment and virtual collaboration from a pupil's perspective. At the same time virtual workshops consolidate the network of teachers, which may later be in contact via the web both nationally and internationally.

4.2.2.1 Technical support in the Action stage

The technical support contains three aspects: user support, general technical support and specific application support. The user support concentrates on how to use the tools and functions of the Synergeia learning environment. The user support will be offered for piloting teachers mainly in teacher training workshops and by individual consulting. The planning of implementing functions and tools of Synergeia are reflected from the point of view of the pedagogical principles: teachers are supported to implement and test Synergeia pedagogically meaningful ways taking into consideration the objectives and curriculums of their learning projects.

The basic software training is in crucial role when offering user support: there should be enough time for studying Synergeia phase by phase, tool by tool and also there should be enough time for shared reflection, questions and collaborative knowledge building. The user support training should encourage teachers to understand the developmental nature of the ITCOLE -project: the alpha version of the Synergeia software is under continuous evaluation and User Stories on pedagogical and technical usability are needed. The teachers will be trained to use User Stories as a method for continuous feedback giving to the software developers. They will also collaborate on software's usability with pedagogical partners of the projects. The pedagogical partners who organise the testing phases, act also as school consultants in the project. They mainly are responsible for user support.

The general technical support is needed when there are local problems in using software, for example problems with school or local networks or school computers. In this case the school consultants collaborate closely with the local Help Desk responsible for ICT services of the school. If pilot schools have problems with functionality of the software and it is not caused because of their ability to use the software (user support) or local technical problems (general technical support) the specific application support will be needed. The school consultants contact immediately to the project coordinator, who will contact the software developers and FIT Experts for solving the problem as soon as possible.

The role of the school consultants is important when evaluating the need for technical support in the process. The school consultants should be able to analyse, is the current technical problem question of user support, general technical support or specific

application centred support? After analysing the consultants choose the valid procedure for offering technical support to the piloting schools:

1. More consulting on how to use the functions and tools of the Synergeia, or:
2. Technical support in collaboration with local Help Desk, or:
3. Contact to coordinator who solves the problem in collaboration with FIT Experts as soon as possible

4.2.3. Assessment and reflection stage

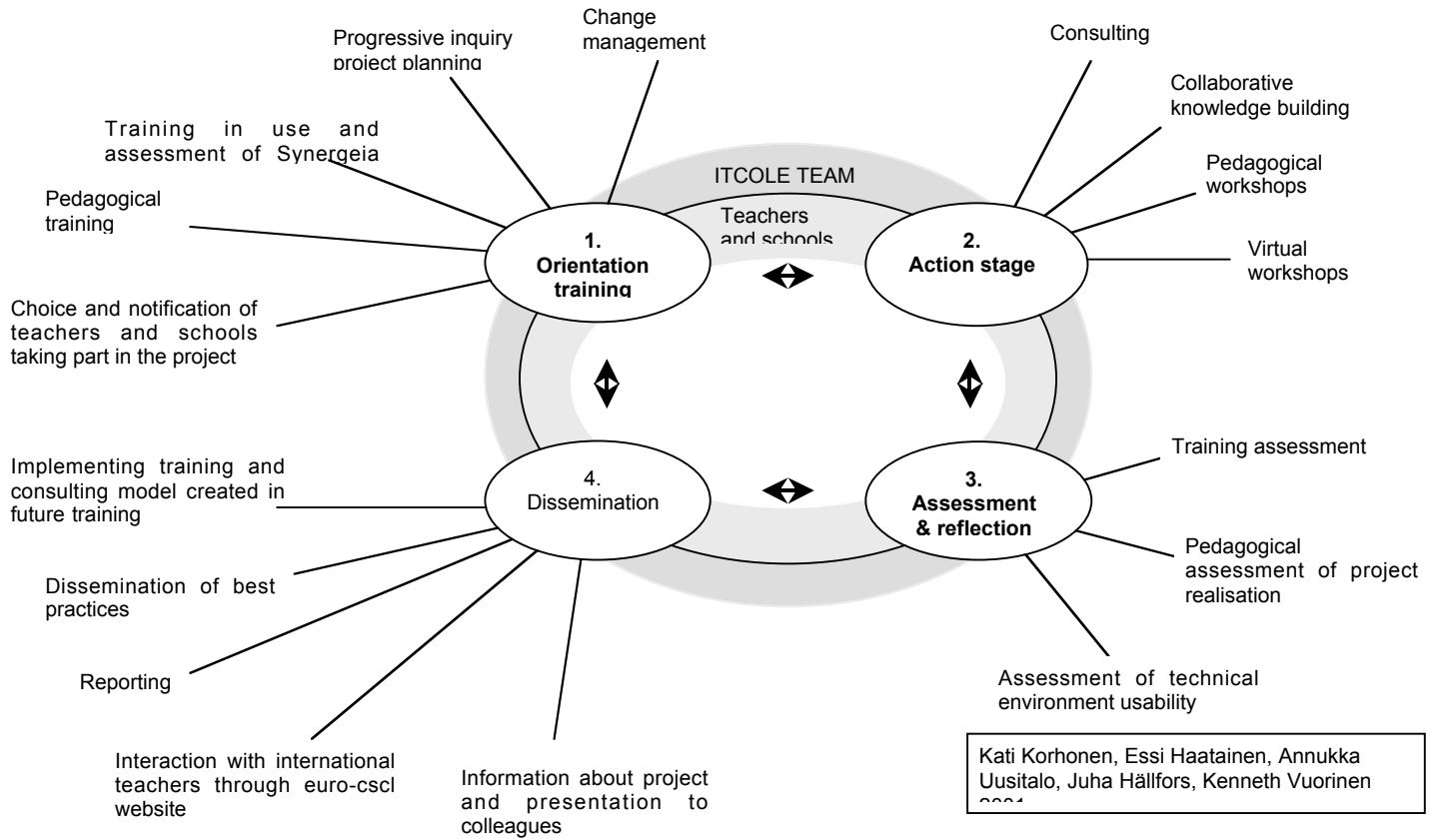
In the third stage of training, teachers reflect on their own experience and assess the usability of the Synergeia learning environment. Pilot teachers in particular are responsible for assessing the training and consulting offered them, the pedagogical realisation of their own learning projects and the usability of Synergeia learning environment from both the technical and pedagogical perspective. The training model has attempted to envisage the Assessment stage of the development process by, in the orientation training stage, arranging training for pilot teachers about central concepts (user interface, pedagogical and technical usability) and assessment methods (incl. Users Stories - and Technical Usability Checklist methods). Assessment is one of the pilot teachers principal tasks in the ITCOLE -project and was agreed during the orientation training stage. Assessment and reflection are realised in close cooperation with ITCOLE -project researchers. Pilot teachers also carry out independent reflection throughout the ITCOLE -project in the form of a learning diary. Assessment is also a crucial part of teacher training when disseminating CSCL and Synergeia learning environment.

4.2.4. Dissemination stage

The final stage in then process is the dissemination of good practices and preparation for the following stage of the ITCOLE -project. In Helsinki during ITCOLE -project after assessment and reflection, teachers report on the learning projects they are implementing, present the projects and tell introduce to their colleagues how they are progressing with them in schools. From the training model aspect, the dissemination stage does not mean the end of the ITCOLE -project but extending training to an increasingly larger target group. Implementation of the dissemination stage of the project is discussed in greater detail in the final chapter of Deliverable 8.1.

The initial plan of the Media Centre of Helsinki City Education Department is that the pilot teachers in the first stage act in cooperation with Media Centre trainers as promoters and trainers of the Synergeia learning environment for pilot teachers in the second stage of the ITCOLE -project. The Media Centre's earlier experiences show that the most efficient way of spreading good ICT pedagogical practices is to let trainers act as teachers in their own reference groups (Hakkarainen 2000).

4.3. ITCOLE teacher training and consulting model on diagram



4.4. Guidelines for teacher training and consulting for the first and second test phases of the ITCOLE -project

In this chapter the proposal for teacher training for the first and second test phase of ITCOLE -project is introduced. The guidelines are planned for the ITCOLE pilot teachers for starting and implementing the first and second phase of the ITCOLE -project. The ITCOLE countries have modified the guidelines planned taking into consideration the local needs and resources and the pedagogical principles and approaches they emphasise. The guidelines introduced in following are the suggestion for "the minimum training for starting the ITCOLE -project successfully". The guidelines follow the pedagogical principles of the virtual teaching dual model: it is organised both in concrete and virtually in Synergeia learning environment. The guidelines presented here are also adaptable and open for the further dissemination phases of CSCL and the Synergeia learning environment.

The most important goals of the teacher training and support:

- teachers understand the pedagogical and technical concepts in the ITCOLE -project like progressive inquiry, collaborative learning, knowledge building, computer supported co-operative learning (CSCL), web-based learning environment, Synergeia - learning environment, the technical and pedagogical usability of the web-based learning environment, User Stories as an assessment method
- teachers know the pedagogical principles and possibilities of the progressive inquiry (or the pedagogical principles and approaches the ITCOLE partners emphasise)
- teachers understand the meaning of the collaboration and the knowledge building for learning
- teachers can use the methods for guiding the progressive inquiry in practice in their teaching
- teachers know the technical and pedagogical principles of the Synergeia learning environment
- teachers can guide the progressive inquiry process supported by the Synergeia learning environment
- teachers can evaluate the process of the progressive inquiry projects implemented in and supported by the Synergeia learning environment
- teachers can evaluate the pedagogical and technical usability of the Synergeia learning environment

The content of teacher training courses:

- I** Pedagogical workshop on planning progressive inquiry project
- II** Synergeia software training
- III** School consulting (pedagogical and technical support)
- IV** Virtual workshop in the Synergeia learning environment
- V** Using the Knowledge Building in the Synergeia environment

I Pedagogical workshop on planning progressive inquiry project

Content of the course:

- guiding discussion with teachers on future challenges on teaching and learning
- introduction of the pedagogical principles of the progressive inquiry
- guiding the teachers to understand the elements of the progressive inquiry for example creating context, setting up research questions, constructing working theories, evaluating the knowledge advancement, searching new scientific information, engagement in deepening inquiry, shared expertise
- introduction of the elements and methods of the collaborative learning and knowledge building by analysing the case studies and comparing them to the traditional classroom teaching
- introduction of the case studies of progressive inquiry learning projects implemented in or/ and supported by the web-based learning environment
- guiding discussion and knowledge building on the benefits of the progressive inquiry and new pedagogical models on learning
- task for the next course: planning the theme for the project on progressive inquiry
- Timetable: 1-2 days

II Synergeia software training course

Content of the course:

- guiding discussion on the basic concepts of the Synergeia learning environment: web-based learning environment, study tools, knowledge building, thinking types, chat and map tools, personal, group and course notebooks etc.
- introduction to the Synergeia learning environment
- introduction of the technical and pedagogical principles of the Synergeia learning environment by special case study created to the Synergeia for the purpose by trainers
- guiding the teachers to plan the progressive inquiry projects in the Synergeia learning environment
- naming the consultants for teachers and schools for pedagogical and technical support
- Timetable: 1-2 days

III School consulting (pedagogical and technical support)

Content of the consulting:

- every pilot teacher has a personal contact to the consultant, who organises technical and pedagogical support in concrete and virtually in the Synergeia learning environment
- consultants follow actively the progress of the project and support the teachers and the pupils
- the support is mainly pedagogical: guiding discussions, collaboration and joint reflections (it is important that the consultant is not only the technical help desk, but the facilitator and co-learner of the process)
- the pilot teachers are consulted by e-mail, over the phone and by concrete school visits and virtually in Synergeia learning environment
- consultancy can also be organised only virtually, in this case the methods how to use Synergeia environment must be carefully planned and agreed in close cooperation with the pilot teachers
- Timetable: The first and second testing phase (January- May 2002)

IV Virtual workshop in the Synergeia learning environment

When planning the theme of the virtual workshop the needs and problems raised by pilot teachers are the most important. There should be anyhow one, clear theme in the workshop, which should be processed thorough. In this example the topic of the virtual workshop is Teacher's guiding methods in progressive inquiry project in the Synergeia - learning environment and in a traditional class room.

The most important practical elements in the virtual workshop are the timetable (starting, processing, ending), the goals of the virtual workshop (enough clear shared knowledge) and the role of the chairperson (introduction, guiding and facilitating the collaboration, drawing the conclusions).

Content of the course:

- before the virtual workshop teachers have studied material on progressive inquiry guiding methods, f.ex, the deliverables of the ITCOLE pedagogical partners or resources described at the end
- the chairperson starts the virtual workshop by introduction which aims to promote and empower the collaboration and knowledge-building, also the theme and goals of the workshop are reviewed and shared
- the goals of the virtual workshop "Teacher's guiding methods in progressive inquiry process on the web and in the classroom" are:
 - teachers understand the role of the guide / facilitator in progressive inquiry process
 - teachers are familiar with different guiding methods and can use them flexibly in different phases of the process
- the chairperson can also introduce the case study planned by trainers in Synergeia environment for the purpose of teacher training
- with case study the chairman can guide teachers to analyse the progressive inquiry project phase by phase and reflect especially the methods a teacher has used as a guide
- it is important that teachers are guided to analyse different possibilities and methods for guiding
- the chairperson draws the conclusions of the collaboration to the shared knowledge of the workshop participants as well as to the documents of the Synergeia -environment
- at the ending phase of the workshop the technical and pedagogical usability of the Synergeia learning environment for teacher training and support is evaluated collaboratively
- Timetable: The virtual workshop shouldn't last more than 2 hours

Suggestions for resources to the processing:

Lakkala, M., Muukkonen, H., Ilomäki, L., Lallimo, J., Niemivirta, M. & Hakkarainen, K. (2001). [Approaches for analysing tutor's role in a networked inquiry discourse](#). In Dillenbourg, P., Eurelings, A. & Hakkarainen, K. (Eds.) European Perspectives on Computer-Supported Collaborative Learning. Proceedings of the First European Conference on CSCL, March 22-24, 2001, University of Maastricht, the Netherlands.

Muukkonen, H., Hakkarainen, K. & Lakkala, M. (1999). [Collaborative Technology for Facilitating Progressive Inquiry: Future Learning Environment Tools](#). In C. Hoadley & J. Roschelle (Ed.) The proceedings of the CSCL '99 conference, December 12-15, 1999, Palo Alto (pp. 406-415). Mahwah, NJ: Lawrence Erlbaum and Associates.

<http://kn.cilt.org/cscl99/A51/A51.HTM>

Look for more articles on the web site of the Centre for Research on Networked Learning and Knowledge Building (UH): <http://www.helsinki.fi/hum/ylopsy/English>

V Using the Knowledge Building in Synergeia learning environment

The use of the Knowledge Building in Synergeia learning environment is linked to the question how much there are resources for concrete consulting. At the beginning of the training and testing phases the concrete meetings and face-to-face collaboration should be emphasised.

Using the Synergeia learning environment should be planned carefully paying attention to the contributions of the pilot teachers and the resources of the trainers. Following example is planned to the situation that concrete consulting is enough resourced and virtual Knowledge Building supports the concrete activities. If only the virtual support is offered the more detailed planning is needed.

Earlier it was mentioned that training is organised in line with the dual model. The dual model doesn't become actual until the action stage, when, in addition to pedagogical workshops, a shared Knowledge Building area is arranged for teachers in an Synergeia learning environment. Teachers can present questions occupying their mind in this shared Knowledge Building area. Trainers and teachers then discuss solutions to pedagogical and technical problems using collaborative Knowledge Building. During the action stage, problems and possible solutions to them accrue in the Knowledge Building area. Teachers can seek confirmation for pedagogical solutions in the Knowledge Building area or ask how other teachers have arranged teaching in the Synergeia, etc. One trainer will be appointed to be responsible for Knowledge Building. He or she will be tasked with ensuring that all questions are answered. One advantage of a shared Knowledge Building area is that teachers can continuously interact with other teachers and trainers irrespective of time and place.

Each teacher can also bring his or her own learning project plan to the Synergeia learning environment so that other teachers can reflect it. All documents relating to joint training are also brought to the environment at the same time. Analysing of these documents is voluntary. Teachers shouldn't be overloaded with long, complex Knowledge Building processes during the action stage because carrying out learning projects is already a tough process.

However, collaboration in the Knowledge Building area is too slow to respond to a teacher's need for rapid help. Interaction during the action stage takes place between teacher and trainer through consultation, which has been found to be the most important form of support in development projects (Hakkarainen et al. 2000).

4.5. Experiences on teacher training and consulting during the first and second test phases of the ITCOLE -project

It was agreed in collaboration with the pedagogical partners of the ITCOLE -project that all partners will contribute the Deliverable 8.1. by describing how the teacher training and support has been organised during project's first and second test phase. The contributions were asked by following, freely formed questionnaire authored by the HC team.

It is important to understand that the other ITCOLE partners represent the Research and Development Units of the ITCOLE -project and the HC partner (the Media Centre of Helsinki City Education Department) is the only organisation resourced for teacher in-service training and consulting.

The answers to the second question, the dissemination of Synergeia, are presented and reflected in the chapter five.

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13th February 2002

ITCOLE project/ Deliverable 8.1.

Questions to the Pedagogical Partners on Teacher Training and Support

Would you please give your contribution to the Deliverable 8.1. "Guidelines for Teacher Training and Supporting Activities" by answering to the following questions. We hope that your answer wouldn't be more than five (3) pages and you would send your answers to the BSCW 's Folder WP 8 on **the 15th of March at the latest.**

The questions:

1. Firstly, we would like to know how you have organised teacher training and support during ITCOLE -project's first and second testing phase? Would you please kindly describe the objectives of your teacher training, the concrete actions and the contents of teacher training and supporting occasions and workshops!

The following questions might help you to reflect your answer:

- What is the theoretical approach / pedagogical principles you have been emphasising when supporting teachers to plan their in-depth learning projects and implement, test and evaluate Synergeia learning environment?
- The dates and contents of teacher training workshops?
- Other support offered for pilot teachers and schools?
- What has been your most important conclusions when supporting teachers in Synergeia piloting?

2. Secondly, we would like to have your comments, thoughts and ideas for further dissemination of the Synergeia and good pedagogical practices developed in the project. What would be the most crucial aspects when disseminating collaborative learning methods and Synergeia learning environment to the every day life of the schools?

4.5.1. Greece

Vassilis Kollias, University of Athens

Introduction

The introduction of Synergeia and the accompanying instructional challenges in Greece are quite demanding. The current introduction of ICT in primary and secondary education is often not accompanied with emphasis on collaboration and transfer of learning responsibilities to students. Although facilitation of inquiry is often mentioned, a very demanding and centralised curriculum in schools, and a teacher centred and transmission oriented philosophy of seriously compromise the realisation of the educational potential of ICT introduction.

The instructional focus of the Greek intervention.

In Greece we have made the following instructional and organisational choices relative to teacher training:

- a) Instructional
 - To focus on learning situations where there is needed conceptual change. Greek teachers at all levels of education need instructing in the current understandings about how learning takes place in demanding subject matter. It is quite common that the teachers do not distinguish the cases where there is needed restructuring of students' understanding.
 - To make salient the special usefulness of Synergeia in supporting learning community cultures and to introduce teachers to the interplay between accounts of social interactions and accounts of conceptual change.
 - To insist on the passing of learning responsibilities to the learners themselves and to the need for careful scaffolding of the collaborative environment towards this end.
- b) Organisational

We introduce Synergeia in everyday classrooms and discourage using it for activities outside the normal teaching schedule. The latter is common with many ICT interventions in Greece and reinforces the belief that ICT is not efficient in mainstream teaching.

In our introduction of Synergeia to the teacher trainers and to teachers we make very salient the transfer of responsibilities for learning to the students themselves as a means for better learning. This is a goal that is well taken by the teachers and recognised as a need for Greek education, and allows the introduction of issues that pertain to conceptual change and to deeper understanding of the interactions in the classroom.

The organisation of teacher training

The teacher trainers that are involved are split in the following groups:

- a) Teacher trainers of secondary school teachers that have already attended one year of graduate training on the introduction of ICT in public schools.

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- b) Teachers from primary and secondary schools that have agreed to play the role of initiators to the uses of Synergeia for their own schools.

The following is the list of the participant teacher trainers

| Teacher | School level, type | Teaching subjects | Training teachers from different schools or from same school |
|----------------------|---------------------------|---------------------------------|---|
| Nikos Kokinakis | Secondary school, public | Humanistic Studies and Language | Different |
| Antoniou Antonis | Secondary school, public | Physics | Different |
| Vassilios Tsitsos | Secondary school, public | Mathematics | Different |
| Ioanna Illiopoulou | Secondary school, public | Humanistic Studies and Language | Different |
| Stavros Kounadis | Secondary school, public | Computer Science | Same |
| Sotiris Vogiatzoglou | Secondary school, public | Mathematics | Same |
| Manos Apostolakis | Secondary school, private | Physics | Same |
| Nektarios Mamalougos | Secondary school, private | Physics | Same |
| Vassilis Tsagalos | Primary school, public | All subjects | Same |
| Simeon Vizaniaris | Primary school, public | All subjects | Same |
| Tasos Papanikolaou | Primary school, private | All subjects | Same |
| Christos Gkonis | Primary school, private | All subjects | Same |

The following tables has the research-teachertrainer workshops in the University, dates and themes. All meetings lasted approximately three hours.

The workshops between researchers and teachers

| Date | Theme |
|---------------|---|
| 26 Sept. 2001 | <ul style="list-style-type: none"> • Presentation of the ITCOLE -project • Presentation of the BSCW • Introduction to our view that it should become part of normal instruction time |
| 17 Oct. 2001 | <ul style="list-style-type: none"> • Setting the roles of researchers, teachertrainers, teachers • Gathering of comments about BSCW (technical and pedagogical) • Agreement to continue with ideas in the next meeting |
| 14 Nov. 2001 | <ul style="list-style-type: none"> • The lack of the software that will be finally used causes little enrolment by the teacher trainers. We encourage themselves to stay with us. |

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| | |
|-----------------|--|
| 29 Jan. 2002 | <ul style="list-style-type: none"> • The new software been in our hands we discuss first ideas • Comments about the software. Discussion about the User Stories. • Issues related with the introduction of Synergeia in schools. The issue of the degree of support and structure that teachers need to design activities with Synergeia. • Prospects of introduction in schools |
| 11 Feb. 2002 | <ul style="list-style-type: none"> • Discussion about the results of introducing teachers in schools in Synergeia • Discussion about current educational designs using Synergeia |
| 5 Mar. 2002 | <ul style="list-style-type: none"> • Current situation of the introduction of Synergeia in schools • Continuation of working on proposed designs. |

Aside from these workshops there have been many telephone and e-mail contacts. Initially the goal of these contacts was to establish commitment to the project and then to introduce the participants to the various literature. As teacher trainers started proposing designs for classroom interventions, interaction moved towards thinking of the principles on the specific designs that they were developing.

The workshops of the teachers to other teachers

In most of the cases when introduction is done in the same school, the other teachers are waiting on the success of this first region (March-April 2002) to decide whether themselves too will enter in the program. Therefore at this point the researchers put a lot of effort in the collaborative construction of good Synergeia activities and the use of these designs for training the teachers in the pedagogical concerns.

However in one school the technology teacher (Kounadis) has started training a biology teacher to the software.

In another public primary school a researcher went and presented the software and its rationale to the teachers. The teachers are waiting for the results from the implementation from one of them (Vizaniaris).

In cases where the teacher trainers were working with teachers from different schools, there are different stories.

The mathematician (Tsitsos) did initial presentations that did not attract much interest. However he insisted and there is currently a design jointly constructed that may end in enrolling two mathematics teachers in the junior high school.

The physicist (Antoniou) has introduced Synergeia on the 25th February and 4th March in Pereaos and on 27th February and 6 March at Nikaia and Keratsini (all these are regions near Athens). In each of the meetings the interaction lasted one hour.

The software was first described and then different functionalities were shown and then dialogues started through the software. An initial problem helped the teachers experiment with the software.

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The Pyreus teachers feel very pressed by the curriculum and they focus on exams. In the Keratsini teachers the low level of ease with ICT makes teachers feel insecure in applying a software that looks so different from whatever they have in mind.

In the Nikaia teachers who teach in junior high schools there has been a very lively discussion. Teachers claimed that the "ways of communicating" are foreign to Greek customs. However they could not really support this opinion.

The Nikaia teachers are at the moment the ones who will most probably try to experiment with the software in their classrooms. Already three teachers, the teacher trainer and the researchers are thinking on different designs on the teaching of Electricity. Issues related to conceptual change, motivating the students, control of the classroom and taking over learning responsibilities and organizing the communication environment are appearing

The two literature teacher trainers (Kokkinakis and Illiopoulou) presented Synergeia to 11 secondary school teachers on February 2002 in the in-site training for the use of ICT in education in Athens. These teachers (as is common with many teachers in Greece) are at the initial stages of acquaintance with ICT in education.

The teachers were interested in the software but find that they need to put quite some time in getting used to the software.

Their concerns were that:

- acquiring some beneficial results from its use will take a lot of time.
- there is a competition in the use of the computer classroom for the teaching of computer science and that it seems that they will need technical support
- that it does not fit with the schedules of the current curriculum
- that the educational system gives a lot of attention to "material covered" and not the quality and that they feel obliged to follow the former
- that they do not feel well prepared for using it in classrooms

Finally they questioned whether the student would be able to acquire a culture of inquiry and appreciate the usefulness of the software.

The teacher trainers encouraged the teachers to experiment and promised their support. However teachers do not feel secure of the learning environments that they form in their classrooms so that the students would follow them even after technical problems. Therefore they tend to ask for ready made applications.

Are we happy with things as they currently stand?

Although Synergeia is used by fewer classrooms than we would like to see in the first phase, we can see in the responses to the questionnaires that the participating teachers are satisfied and feel they are learning. We are already at a stage that we expect interesting designs.

Since we know that other teachers are following this effort with a benign interest we work hard at supporting different projects with the aim of developing the conviction that good activities can be developed. They do not need to be pre-packaged.

4.5.2. Finland

Essi Haatainen, Helsinki City

Kati Korhonen, Helsinki City

In this chapter some practical teacher training actions of Helsinki City are introduced. This training calendar was also introduced during Autumn term 2001 and published as a draft of the Deliverable 8.1 in November 2001 to support the first and second testing phase of all ITCOLE partners.

There are 10 piloting teachers and about 250 pupils in Helsinki in a first and second testing phase of the ITCOLE -project. The teachers implement the progressive inquiry projects supported by Synergeia during the spring term 2002. In a third testing phase, the autumn term 2002, there will be at least 20 teachers and 500 pupils. The pilot teachers and pupils are from lower and upper stage comprehensive schools as well as from secondary schools and special education schools.

Some Examples of teacher training contents:

A Orientation training

| | |
|--------------------|---|
| 28 April 2001 | Teachers' planning seminar |
| 15 May 2001 | Teachers' planning seminar |
| 27 August 2001 | Teachers' planning seminar |
| 11 September 2001 | User interface analysis, BSCW4 learning environment and User Stories assessment method training |
| 10 October 2001 | Progressive inquiry training day |
| 24 October 2001 | Web-based education training day for beginners |
| November 2001: | Individual school and teacher consultation |
| 20 November 2001 | Web-based education training day for advanced teachers |
| 10-11 January 2001 | Pedagogical workshop on progressive inquiry project planning and Synergeia software training |

B Action stage training

| | |
|-----------------|--|
| 24 January 2002 | Project planning pedagogical workshop |
| 30 January 2002 | Project planning pedagogical workshop (optional) |
| 7 February 2002 | Virtual workshop: Teacher's guiding methods in progressive inquiry process on the web and in the classroom |
| 8 March 2002 | Change management training |
| 12 March 2002 | Virtual workshop: Resistance to change and how to face it |

C Assessment and reflection stage training

| | |
|---|--|
| 7 May 2002 | Concluding seminar |
| Additionally Teacher Knowledge Building Area in the Synergeia learning environment from December 2001 to May 2002 | |
| School Consulting | About 25-30 consulting occasions in a pilot schools and classrooms during the Action Stage |

The training and consultation model was mostly planned during the orientation training period in cooperation with pilot teachers and Finnish ITCOLE partners (University of Art and Design Helsinki UIAH and the University of Helsinki UH). Nevertheless, the orientation training period is seamlessly integrated into the action stage period, where it serves as an introduction. This chapter describes some practical examples of the content and methods of training in the orientation and action stage. The content can be freely applied, further processed and modified by the ITCOLE -project partners as the project progresses. Partners can also develop their own national and local solutions in order to arrange project training.

A Orientation stage training

28 April 2001 Teachers' planning seminar

The training day sought to present the ITCOLE -project generally and the roles, aims and ways of working of those taking part. Training also aimed at promoting the adoption of shared concepts and the definition of operating models. Before the planning seminar, we talked with all the teachers chosen to take part about charting their interest and motivation and defining teachers' aims. The support of school heads was also confirmed.

15 May 2001 Teachers' planning seminar

The training day was organised in cooperation with our partners, the University of Art and Design Helsinki and the University of Helsinki. Training set out to clarify the overall project picture, to present the different areas of responsibility of our partners and to describe the input required by pilot teachers. The seminar also sought to introduce teachers to the orientation training period taking place during the following autumn term and to take into account the aims, needs and wishes of the teachers and pilot schools as far as the project was concerned. Training gave a preliminary introduction to the euro-cscl education Idea

Bank euro-cscl pages and we discussed ways of sharing previous teaching experiences and integrating them into the project.

27 August 2001 Teachers' planning seminar

The ITCOLE training calendar was planned in collaboration with teachers and a joint understanding of the aims and ways of carrying out the project was confirmed. Training set out to further consolidate teacher collaboration, promote awareness of the aims of the project and to explain, actualise and to analyse project concepts. Training also thought out the possibilities of euro-cscl Idea Bank to disseminate and share previous experiences.

11 November 2001 User interface analysis, BSCW4 learning environment and User Stories assessment training

Training set out to introduce teachers to the key terms and operating models of the project. These include an assessment of the technical and pedagogical usability of the Synergeia learning environment, assessment methods and a general user interface analysis as a form of support for assessment work. Training aimed at giving pilot teachers both conceptual and functional tools to assess the pedagogic and technical usability of the Synergeia learning environment. The aim was also to introduce the BSCW4 learning environment and as an orienting model providing a benchmark for comparison to Synergeia learning environment. Use and assessment of the BSCW4 learning environment is one of the optional tasks for pilot teachers and a total of six pilot teachers assessed it during the autumn term of 2001 before deployment of the Synergeia learning environment.

10 October 2001 Inquiry learning training day

The training day was organised in cooperation with our partner, the University of Helsinki. Training set out to build on the teachers' understanding of concepts, theory and methods of inquiry learning, collaborative learning and knowledge building in the learning projects.

24 October 2001 Web-based education training day for beginners

The training was organised by the Media Centre and it was optional for teachers taking part in the ITCOLE -project. The training day set out to introduce participants to the various opportunities afforded by web-based teaching: searching for information on the internet, teaching resources services, various virtual course services, interaction and the possibilities of publishing information online and in web-based learning environments.

November 2001 Individual school and teacher consultation

Throughout the entire autumn term, Media Centre trainers also personally consulted teachers and schools by school visits, over the phone and by e-mail about the general use of information networks to support learning and about the BSCW4 learning environment. In November, teachers and school heads also gave a final commitment to the project, which the director of the Media Centre confirmed by an official decision.

20 November 2001 Web-based education training day for advanced teachers

The training was organised by the Media Centre and optional for teachers taking part in the ITCOLE -project. Training set out to build on the teachers' understanding of the web as a media, to enhance media reading skills and competence, the opportunities offered by web-based teaching and planning a learning project for the web.

10-11 January 2001 Pedagogical workshop on progressive inquiry project planning and Synergeia software training

Training introduced pilot teachers to the technical and pedagogical aspects of the Synergeia learning environment. During the training day, the training and consulting model, the principal concepts and methods used in the project were collaborated and reflected. The idea is for teachers, supported by trainers, to start work on planning learning projects during this training period. Training made an effort to switch as quickly as possible from technical software management to the pedagogical planning of learning projects. Training was implemented in association with the project coordinator.

B Action stage training

In this context, action stage means the period during which teachers implement learning projects supported by the Synergeia learning environment, in other words from January to May 2002.

The virtual teaching dual model is being applied to training during the action stage. Teachers have access to the first version of the Synergeia learning environment and, complying with the principles of the project, the virtual training has been used as much as possible. The Synergeia learning environment has been tested and evaluated both technically and pedagogically, and its possibilities as a teacher training tool has been reflected.

Virtual workshops

In this context, virtual workshops means problem-centred knowledge building lasting a couple of hours where teachers, trainers and experts collaborate in real time. Virtual workshops sought to build knowledge on a joint topical problem-statement, which all those taking part have been tasked with finding out about beforehand. As a result of knowledge building, teachers reach joint understanding about the matter. A virtual workshops had particular, strictly limited problems stated and a chairperson who coordinated the knowledge building.

We chose the following subjects for our virtual workshops: 1) Teacher's guiding methods in progressive inquiry process on the web and in the classroom and 2) Resistance to change and how to face it. Choice of these topics took into account the fact that they were in accordance with the wishes and needs of those teachers taking part in the project and that they furthered the realisation of the aims of the ITCOLE -project.

One of the trainers was responsible for guiding the virtual workshop. She was appointed virtual workshop chairperson. The chairperson was responsible for notifying participants of the date, ways of working, participants' roles, working possibilities and of any prior preparation work. It was also a good idea for the chairperson to think of a precise aim for the workshop (i.e. a solution to a problem arising or a strategy for joint action). During the virtual workshop, the chairperson was responsible for starting the workshop with a brief presentation of the problem stated and for generating discussion by presenting some provocative initial questions. The chairperson acted as a guide in the knowledge building, in other words he or she ensured collaboration was generated, that it progressed and that participants kept to the point. The chairperson was also responsible for ending the discussion, summing up and drawing conclusions. At the end of discussion, it was also a good idea for the chairperson to remind participants of the date of the following workshop and of any preparation work to be done for it.

It was a good idea to critically assess the number of participants in the virtual workshop so as to achieve productive, practical discussion and knowledge building. The intensive virtual workshop seemed to work with maximum ten active participants.

24 January 2002 Project planning pedagogical workshop

The workshop helped and furthered the planning of teachers' progressive inquiry projects in the Synergeia. Training also aimed at introducing teachers to project planning, management and assessment as well as the peculiar features, phenomena and requirements of the development process.

30 January 2002 Project planning pedagogical workshop (optional)

The teachers had another opportunity at the Media Centre to receive guidance in the launching stage of their own progressive inquiry project. This pedagogical workshop dealt with the problems arising from teachers' work in practice.

7 February 2002 Virtual workshop: Teacher's guiding methods in the progressive inquiry process on the web and in the classroom

The problem-centred Knowledge Building workshop built on teachers' understanding of the progressive inquiry process and guiding the process both on the web and in the classroom. Preparation work for the workshop included reading the material relating to the topic and reflection of the subjects presented by material. The guiding the progressive inquiry process workshop took place in the early stage of learning projects so that the conclusions of the workshop benefit teachers in guiding and facilitating their learning projects.

8 March 2002 Change management training

The ITCOLE -project is part of a much wider change taking place in the teaching and learning culture in schools; promoting the use of information and communication technology in teaching. Developers, promoters and people responsible for the project should therefore be aware of development process and change management phenomena such as resistance to change. Training gave ITCOLE teachers acting as project representatives the readiness and tools to act as consultants and developers.

12 March 2002 Virtual workshop: Resistance to change and how to face it

The problem-centred virtual workshop implemented in a Knowledge Building Area continued the discussion about resistance to change and how to face it initiated in change management training. The aim was to build on teachers' understanding of change management and to equip them to face resistance to change. The workshop was based on the material obtained during change management training and teachers' own experiences. This workshop highlighted the role of the chairperson as a knowledge building initiator and guide.

Teacher Knowledge Building Area in the Synergeia learning environment

There has also been a long-term teachers' Knowledge Building Area in the Synergeia learning environment from December 2001 to May 2002, during the Action Stage. The Knowledge Building has been acted mainly as a FAQ function, but it has also encouraged some shared expertise among teachers, trainers, and researcher. Also training materials and conclusions of teacher training workshops has been collected to the Synergeia Teacher Folder and collaborated in the Knowledge Building Area.

School Consulting during the Action stage

There has been about 25-30 consulting and teacher training occasions in a pilot schools and classrooms during the Actions stage. Every pilot teacher has a personal school consultant who participates to the progressive inquiry process supported by Synergeia learning environment according the wishes of the pilot teacher. The consultant collaborates with teachers and pupils, offers pedagogical and user support and mediates technical support. The consultants participate to the real learning situations in classrooms and supports teachers as a "co-learners" and "co-reflectors".

C Assessment and reflection stage training**7 May 2002 Concluding seminar**

The concluding seminar is scheduled at the end of the action stage and beginning of the assessment and Reflection stage. The seminar sets out to share common experiences, present teachers own projects and plan further actions (dissemination). The seminar also seeks to plan individual information and training events for teachers and to share experiences in the international ITCOLE teacher seminar.

4.5.3. Italy

Beatrice Ligorio, University of Salerno

In Italy we organised the teacher training combining three types of action:

- a) face to face training. Local and national meetings have been carried out during which the project has been presented, discussed and analysed.
- b) Monitoring the classroom sections. Researchers trained for this project observed the classroom sessions. During the observation the researchers used some grids designed for this purpose. Some of the sessions have been videotaped.
- c) Distance training. Synergeia (along with email) has been used for this purpose.

The theoretical approach we emphasised is related to the PIM along with the principles coming from the community of learning, constructivism, and collaboration at a distance principles. We collected data from the videotapes, the observation grids and from the reports wrote about the meetings.

Most of our pilot teachers have been very enthusiastic to assume a research perspective in their work. They enjoyed a lot on using the software to assess it and to formulate new ideas. The teachers also demonstrate reflective and critical thinking at a theoretical level.

Workshops for Italian teachers

Title

Collaborative learning and New technologies. The ITCOLE -project.

Date & place

17 January, Rome (it was a workshop for all Italian teachers)

Contents and methods

After the introduction of the ITCOLE -project's phases, it has been discussed about: the activities in the classrooms; evaluation tools; the user stories. After a training with Synergeia, the Progressive Inquiry Model and the CoL's Model have been discussed analysing some video concerning discussions in classrooms involved in computer supported tasks.

Main conclusions and follow up actions

Classroom activities have to reach operative and concrete aims: they have to aim at building a shared and meaningful product ("an object of thought"). It was important in order to support students' motivation about the task.

About the user stories, all teachers, testing Synergeia, can evaluate it and write their impressions through the user stories.

About classroom activities, the collaborative working relationships among the participants have been defined. Each group and school will put its works in Synergeia and so all the participants can read and use other people's contributions. In this way, we'll have a circular and continuous exchange to reach a genuine collaborative learning.

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Participants *3 researchers; *1 researcher assistant; *15 teachers; *7 last year undergraduates

Title

Discussing learning contents and methods

Date & place

28 February, Rome

Contents and methods

"Works in progress" in each school have been analysed. Proposals about how to go on have been discussed.

All the classrooms in Rome's primary school ("C. Ferrini") and one classroom in junior secondary school ("Casal del Marmo") are preparing the introduction to present themselves to the other participants. These classes are working on *the diversity* (that was proposed as discussion argument) writing some stories (taking as a starting point "L'omino di vetro" by Gianni Rodari) and adding them in Synergeia. Teachers have talked about how to discuss the stories on line. They have accented to the following proposal: their students will build a shared reflection and recursive linguistic analysis on the stories.

In Milano and Rome's junior secondary schools, a starting discussion on the diversity has been organised. Each student is inserting some contributions in Synergeia to explain his own point of view on the argument. An on line discussion and knowledge building is taking form.

Main conclusions and follow up actions

Teachers of the primary school and secondary school have decided to work on the stories, in Synergeia, asking the students to read them and to send to the authors some observations about the communicative efficacy of their text. On the basis of these observations, students will collaborate building their knowledge. Teachers of the junior secondary schools will ask students to search different kind of text (narrative, philosophical, newspaper cutting...) on the diversity and to add them in Synergeia as a resource to discuss with the others.

Participants

*1 researcher; *1 researcher assistant; *8 teachers;
*5 last year undergraduates; *1 apprentice

Title

Organisational matters and new schools.

Date & place

12 February, Salerno (The meeting is hold at the university)

Contents and methods

Some reflections on the meeting hold in Rome were discussed. A new school is joining the project. The school has been informed of what done so far and what we are expecting

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from the school. We discussed how to organise the collaboration among the schools from the south, how to proceed for the questionnaires, how to organise some video shooting.

Main conclusions and follow up actions

All the schools share the idea of working on the diversity. Responsibilities were assigned to teachers, researchers, and assistants.

Participants 1 researchers; 3 teachers; 3 last year undergraduates

Title

Virtual meeting

Date & place

27 March, the meeting has been hold on-line

Contents and methods

it has been discussed how to link the discussion hold so far to a real and concrete building activities. The school from Milan had several proposal and they have been examined.

Main conclusions and follow up actions

it has been decided that every Wednesday we will meet on-line to dedicate time for the building activities. The reports about what it has been done all line will be posted on the Synergeia. Reports will be written by the teachers, students, observers, and researchers.

Participants 2 researchers; 2 teachers; 1 last year undergraduates

The Netherlands

Bruno Emans, University of Amsterdam

Bart Lauret, University of Amsterdam

In the Netherlands, the professional development of the teachers took place in three phases. As the Synergeia environment and the Itcole approach is rather complicated, we started to make a group of ICT- co-ordinators enthusiastic by showing them electronic learning environments and their possibilities. (ICT- co-ordinators are normal teachers with some special assignments to plan and co-ordinate the use of ICT within a school).

In the second phase, ICT- co-ordinators that were interested received an additional training with the Synergeia environment. During this session, the subject "Schools of future" emerged. This program is based around the idea that pupils will have to design the school of the future. After this session A lesson program according to the jigsaw method was developed: First expertise groups are formed: a group of pupils specialises in finance, another in architecture etc. After the first phase, the groups are mixed, resulting in groups that consist of a financial expert, an architect etc. All groups now have to design the school of the future.

The third phase is meant for the teachers that will take part in the first testing phase of the Synergeia environment. In two sessions, all important aspects of the environment. During

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the first session, all necessary skills for using Synergeia were introduced. After this session, all teachers must be able to work with the environment without any problems. To reach this, we only introduced them to the very basic features of Synergeia: Making notes, thinking types, uploading of documents, pictures and URL's. In the first testing phase, we only will test these features, as more will be too difficult for the teachers and the (primary school) pupils. Maybe it can be done with secondary school children.

The second session will be used to introduce the teachers to the didactical and pedagogical principles of the project they will be running, and the organisational aspects of the project will be discussed.

During the testing phase, the researchers are always present to help with problems. The researchers will be present during as much testing sessions as possible, and will guide the teachers as much as possible during other times, when guidance is needed.

| | Date | Description |
|----|-----------------|--|
| 1a | 22 January 2002 | In the first phase, the ICT- co-ordinators of 50 schools received an introduction to Electronic Learning Environments in general, and more specific to BSCW and the Synergeia environment. Two sessions of 25 persons were held. This is the first one. |
| 1b | 29 January 2002 | Session 2 with again 25 persons. |
| 2 | 12 March 2002 | 15 ICT- co-ordinators that were possibly interested in participating in Synergeia were trained to use the Synergeia environment. During this session, the subject "Schools of future" emerged. This program is based around the idea that pupils will have to design the school of the future. |
| 3a | 2 April 2002 | The first session of the training for teachers that will participate in the first testing phase is dedicated to learn to use the Synergeia environment. Only basic features are trained, as the more sophisticated features will be too difficult for primary education. |
| 3b | 10 April 2002 | The second session of the training for teachers that will participate in the first testing phase is concerned with the underlying didactical and pedagogical principles. Furthermore the organization of the project will be discussed |

The didactical and pedagogical principles that we train the teachers in, is based on constructivism and collaborative learning. We introduce the Progressive Inquiry Model (PIM) to the teachers, but we do not force the teachers to work with the model. Teachers can use it as a model in the background. Much more important is that they understand the principles of collaborative learning. In a later phase, the teachers can focus their attention, and start using the PIM.

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In general schools in Holland are moving to a pedagogical approach that beliefs children can fully develop when three basic needs are fulfilled (Stevens, 1997, Lauret 2001):

1. The need for relationships

Children need to perceive themselves as being capable of having satisfying relationships with peers and adults.

2. The need for competence

Children need to perceive themselves as being capable of fulfilling assignments and tasks.

3. The need for autonomy

Children need to perceive themselves as an autonomous human being who is heard by others and who is able to influence others.

In our training we emphasise the contributions that collaborative work can make to these basic beliefs.

Furthermore we think that the interaction increases motivation of the pupils. When pupils have fun, the effect of the learning is bigger. We want to teach the trainers to support these processes.

A last point about pedagogical principles that we want to stress here, is the fact that, in our view, collaborative learning works best when the collaboration is done between classes and not within only one class. In one's own class, a pupil will know all other pupils and the ones he does or does not want to work with. Collaboration with someone unknown is a much bigger challenge and will force the pupil to make the best of it.

We want to conclude with some remarks on the Synergeia environment, and how to use it. We noticed that teachers do not like to be testing-subjects, used to test beta-versions of a program. We acknowledge this fact and feel that only "perfect" versions of an environment can be distributed to teachers, even when it is a beta-version. It is easy to motivate teachers with new tools, but it is just as easy to de-motivate them. In the latter case, you might not see them again.

It would be good for the Synergeia environment to have a "standard" version with only the basic tools available (for the "ICT-dummies" among the teachers) and have an adaptive version available, that the teachers can customise to their own wishes (for the more experienced teachers). The version as it is now might be too difficult for the first group, where the second group might think of other tools that can do the job better.

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5. Synergeia learning environment as a part of the change in a school's teaching and learning culture

Planning and developing a training and consulting model in Synergeia learning environment is part of a more extensive development process of the use of information and communication technology in teaching. In this context, it is a good idea to examine more broadly the change in the teaching and learning culture in the schools taking part in the project. The training and consulting model sets out to promote the pedagogical implementation of information and communication technology in schools. This is why the training and consulting model does not just take into account the teacher's aspect but also that of the entire school and the development of its teaching and learning culture.

The use of information and communication technology in teaching calls not just for a reassessment of teachers' skills and the support of professional development but also for support of the change in the operating culture of the entire school. Therefore, the training and consulting model is not a ready plan or programme to train teachers. It is more a question of an extensive development process that the training and consulting model for its part seeks to steer into the desired direction. First and foremost, the training and consulting model seeks to support and promote the learning process and development work enabled by the Synergeia learning environment in schools.

Implementation of Synergeia learning environment and the development of its pedagogical principles can be part of a school's broader information strategy. This means it can also be defined as a method for developing the activities and learning environment of the entire school. The training and consulting model aims at establishing the use of the Synergeia learning environment in schools and as part of a school's information strategy and curriculum once the project itself is completed. This would also be the most practical, actual practice for disseminating the pedagogical innovation of the ITCOLE -project. At best, as part of a school's own ideal information strategy, application of Synergeia software would become established as a practical method to further a new learning culture.

Critically thought, collaborative learning, an inquiring teacher and reflection ability are key concepts relating to enhancing reform and change in schools and thus are also key concepts in training and consulting in the Synergeia learning environment. Quality change in schools also calls for the commitment to the entire community to development work. This on the one hand anticipates successful dissemination of the result of the project and, on the other, the establishment of the new method as part of the school's dynamically developing activity culture. This viewpoint also highlights the fact that the development takes place based not just on the teacher's own aims and starting points, but also those of the school. Members of the community must be collaborated with why and how the school is to progress with using information and communication technology, for instance the Synergeia learning environment, in teaching. This provides the community with an opportunity to learn about their own learning process, reflection on teaching methods and, for example, progressive inquiry.

In multiform projects of change such as the ITCOLE -project, it is important to remember not to place impossible demands on the teachers and schools taking part in the project but

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to stick to realistic aims at a level determined by the school's own needs. Only good, properly planned development work generates the kind of positive environment and working structures with which the school's teachers taking part in the project can concentrate their energy and enthusiasm on successful development. Resources should be allocated and support given for every attempt at development. If a school undertakes to implement several different kinds of projects, supporting different activities may dissipate the school's resources and it is then likely that none of the development projects will prove to be effective. Planning a teacher's professional development should ensure that the teacher's and the school's needs are in balance. A change or development project will succeed when there is an atmosphere fostering encouragement, reward for development, encouraging and contributory style of management, intensive communication and safety. The readiness of the organisation to start a project would also seem to be an important variable (Syrjäläinen 1994; Ruohotie 1996; Koli & Kylämä 2000).

The readiness of the entire organisation to take part in school development work depends, among other things, on the school head being aware of the stages and difficulties of development work. This increases support for development work. It would appear the school head also plays a decisive role in school development work. Nevertheless, it is not always possible or even wise for the entire school to take part in development work proper. Because school heads and management are in a key position in giving developers the authorisation and resources to act, the preparation stage of the ITCOLE -project training and consulting model should consider school heads as a key factor impacting on the success of training and thus the entire ITCOLE -project. School heads must be given adequate information about training and the related practical arrangements and costs and of the input required by the teacher. A school head must also be able to take part in establishing the aims in respect of his or her own school such as what benefits the school can expect from the project (i.e. professional development of teachers, implementation of a new method for progressive inquiry, etc).

If a development project, such as ITCOLE -project, is understood only as a teacher's individual process, it may turn into an "unpleasant personal endeavour". Teachers, just like any other professionals, are reluctant to adopt new practices until they feel certain that they work. Change and new experimentation may mean risk and even a threat to professional pride. Development projects seem to succeed in those schools where teachers are collegial and for whom the administrative authorities arrange a context to help each other. Teachers are deeply committed to establishing a goal together in development projects they have initiated themselves. An experimental and innovation suggestion is often left to a development group to deal with rather than being taken up by the governors or steering group (Nyman 1999; Guskey 1996; Kaikkonen 1999).

One way of promoting the advent of information and communication technology, such as the Synergeia learning environment, in the learning culture is to make teaching development a collaborative project for the entire school in the school activity plan or even in its curriculum. This could take place, for example, by getting the school to plan teaching in individual area or subject or integrated groups by offering alternative ways of learning as part of the learning process and carrying out the planned concept (Koli & Kylämä 2000). In practice, precisely this will take place in progressive inquiry learning projects to be implemented in the Synergeia learning environment in the spring term of 2002. It is up to the independent discretion and assessment of the schools taking part whether they

subsequently want to integrate the method as part of a contributory school activity culture and curriculum. This is naturally for each school itself to determine on the basis of its own aims. Nevertheless, the training and consulting model, for its part, seeks to support this process and change.

5.1. Dissemination of CSCL in Helsinki

The ITCOLE -project sets out to produce a free learning environment for the benefit of everyone. The Synergeia learning environment is based on collaborative learning and knowledge building for the use of all interested schools in Europe. There are plans to disseminate the good pedagogical practices and project results of the Synergeia learning environment to other schools in the fourth or conclusion and assessment stage of the training and consulting model.

We recommend that the training organiser plans the dissemination of the innovation on the local level taking into account the needs and aims of the school in its area and the structures, methods and resources available. We have illustrated some preliminary plans for dissemination of the ITCOLE -project innovation in schools in Helsinki. Dissemination is most effective if the training organiser is able to draw on existing organisational facilities to promote the use of information and communication technology in teaching, for instance training models, methods, development projects and strategies already planned and implemented.

The experiences of teachers of different grades and research findings reported during the ITCOLE -project, as well as the pedagogical and technical development of the software has a decisive impact on the practical actions to plan dissemination in Helsinki. In Helsinki, the Dissemination stage can be incorporated as part of the Media Centre's general training and courses offered and information strategy work in Helsinki schools. Trainers and pilot teachers in the ITCOLE -project act as course trainers and facilitators of learning projects implemented in the learning environment in future. The dual model, or actual teaching and virtual teaching in Synergeia learning environment are used as a basis in implementing courses. Therefore dissemination primarily takes place as part of the Media Centre's target-driven activities to use of information and communication technology in teaching pedagogically meaningful ways.

5.1.1. Information strategy work as a support of dissemination

As far as school development is concerned, the ITCOLE -project can be incorporated as part of information strategy work in Helsinki schools. In the first stage, the pilot teachers in the project will also possibly draw on the Synergeia learning environment and experiences they gain during the project as part of the information teamwork and information strategy in their own schools. Later, as activities expand, the Synergeia learning environment can also be incorporated as part of the dynamically developing information strategy work in other Helsinki schools. This requires that the project research and teachers' experiences have shown the innovation to work pedagogically and technically and thus it can be assessed as being productive from point of view of the pupils' learning process and one of the factors promoting productive learning.

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In Finland, the individual municipal solutions in development work relating to the use of information and communication technology in schools differ from one municipality to other. Helsinki City Education Department has guided the use of information and communication technology in teaching by, among other things, setting the general framework for information strategy work in schools in 2000 and by actively guiding schools to develop their own information strategies. In this context, information strategy means operation models in schools that can be used to develop the use of information and communication technology in teaching and learning and it should address a broad improvement in the quality of teaching and learning environments (Koli & Kylämä 2000).

Each general education school in Helsinki prepared an information strategy for the use of information and communication in teaching by the autumn term of 2001. Helsinki City Education Department consulted with school representatives to develop an information strategy for each school so that the strategies would comply with the strategic intent of the Helsinki City Education Department that pupils would have equal opportunities to use ICT irrespective of the school or educational institution.

The strategic intent of Helsinki City Education Department promotes following: 1) Setting up information teams in schools, 2) Defining the ideal level of pupils' information and communication technology skills at the end of lower and upper stage comprehensive school, 3) Creating a plan to draw on information and communication technology in pedagogical improvement in the school, 4) Preparing a training plan for school staff, 5) Planning equipment, software and rooms, 6) Improve the rules for using school information technology, 7) Planning technical support, 8) Planning internal and external communications and 9) Assessing the development of the use of information and communication technology in teaching.

This strategic intent for ICT is that by the end of comprehensive school, each pupil has taken part in a web-based learning project (City of Helsinki Education Department intranet 2001). This web-based project is a learning project in the Synergeia learning environment for schools taking part in the ITCOLE -project. However, the aim of activities and development is that the software will remain a functional tool for collaborative knowledge building learning projects at the pilot schools and later become such a tool in other schools.

5.1.2. Information strategy teams of the schools

Between 1999 and 2000, information teams were set up in Helsinki schools. These teams are tasked with supporting the use of ICT in teaching through joint projects and responsibility for information strategy work in schools. The teams comprise teachers who actively use information and communication in their teaching.

Members of school information teams receive training in the Synergeia learning environment in the dissemination stage of the project. Application, deployment and the implementation of learning projects are at the discretion of the information teams and the aims and needs of the school in accordance with its information strategy. Media Centre trainers and pilot teachers continuing as trainers act as information team consultants for each school as required.

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There are also pedagogical experts, teachers, working in Helsinki City Education Department and in Helsinki schools. These expert teachers receive special training to promote the Education Department's strategic development points. For example, during the school year 2001-2002, there are information and communication expert teachers from 11 different school grades. These expert teachers are tasked with supporting and training Helsinki teachers in using information and communication technology in teaching and with promoting good practices. Efforts are also being made to arrange training in and information on the Synergeia learning environment, good project practices and research findings for these special teachers.

Some of the expert teachers with a ready network of teachers for project dissemination have also been chosen to act as pilot teachers in the first stage of the ITCOLE -project. During the project also other pilot teachers will receive training to act as consultants and to promote the innovation as mentioned before.

5.2. Perspectives of dissemination in Europe

The ITCOLE partners were asked to contribute the Deliverable 8.1. also by describing their comments, thoughts and ideas for further dissemination of the Synergeia and good pedagogical practices developed in the project (see also chapter 4.5). The essential question was: what would be the most crucial aspects when disseminating collaborative learning methods and Synergeia learning environment to the every day life of the schools?

5.2.1. Greece

Vassilis Kollias, University of Athens

Disseminating Synergeia

The Greek educational system is greatly constrained by a curriculum that poses impossible demands on teachers and students pushing students to memorization and teachers to constrain their creativity in teaching. As a result of this situation teachers and students come to have very constrained understandings about what learning is about. Therefore we need to establish different “paradigmatic cases” of learning and making them mainstream.

The most crucial aspects when disseminating collaborative learning methods and Synergeia learning environment to the every day life of the schools in Greece are:

- to establish a distinct visibility of the Synergeia learning environments based on a different “pedagogical feel” and not only on the existence of the software
- to establish that this is at least as respectable a way of learning as any traditional one
- to provide proof that it can be very efficient in certain well respected instructional goals.

Since it is impossible to achieve this outside of everyday life we need to establish Synergeia learning environments gradually:

In the eyes of the school the issue will be “learning how to use ICT in the classrooms” (this is well recognised as needed) and the other teachers will have a positive attitude if they expect that this is the knowhow that is coming to their school in the form of “ready-made” solutions.

But the researchers should take care that the issue of their interaction with the participating teachers will be developing novel pedagogical practices and local pedagogical expertise. The teachers that participate in the projects must be supported to construct pedagogically superior activities in collaboration with the researchers and get convinced in practice that in this way they can create activities that fit in their classroom in ways that wouldn't be possible had they been prepackaged. Teachers' pedagogical training is necessary in order to develop this appreciation.

We are been lead in the hypothesis that a major challenge in this teacher-researcher relationship is that teachers see the contribution of researchers (aside from making the

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software available) as a contribution of “ideas” or “clever fixes”. They do not expect conceptual tools and methods of interpretation that can support them to

- a) analyse meaningfully current situations in the classroom and
- b) find ways to achieve the deeper goals that are mentioned in the national curriculum

This hypothesis needs further research.

5.2.2. Italy

Beatrice Ligorio, University of Salerno

At this moment it seems that the key for a successful implementation of such a project is to have really committed, enthusiastic, and motivated teachers. For further dissemination we will try to use those teachers as peer tutoring for the new teachers to be involved.

Also we found that the contact with teachers from other schools is very motivating for our teachers.

To improve the everyday life, in the Italian school still some organisational problems need to be solved about the access to computers.

The main problem that teachers found is the difficulty to link to Synergeia their daily professional activities. Most of them seem to perceived the activities around Synergeia as not really part of the classroom curricula. For the next phase we will concentrate specially on this issue.

5.2.3. The Netherlands

Bruno Emans, University of Amsterdam

Bart Lauret, University of Amsterdam

In our view, the best way to disseminate the Synergeia environment is to distribute it through School Advisory Boards and/or Teacher Training Institutes. These institutes are the first ones where the schools will look for new tools or programs.

We must avoid that the Synergeia environment will be only on the shelves of some research institutes, as it may never come of these shelves again.

5.2.4. Conclusions

The ITCOLE testing partners have shared lot's of expertise, good practices and ideas about dissemination of the project products and practices. The partners agree on the importance of the carefully planned and organised professional dissemination strategy. The teacher training, dissemination of pedagogically meaningful practices on CSCL and co-operation of the pedagogical researchers are considered as key actors for successful dissemination.

Greece underlines on the need for "ready-made" solutions; teachers will have a positive attitude towards new CSCL practices if they expect that this is the knowhow that is coming to their school from practice. It is important to support and develop local pedagogical expertise, the know-how on school level. The teachers that participate in the projects must be supported to construct pedagogically superior activities in collaboration with the researchers and get convinced in practice. According the Greece one crucial aspect when disseminating collaborative learning methods and Synergeia learning environment to the every day life of the schools is to establish a distinct visibility of the Synergeia learning environment based on a different "pedagogical feeling" and not only on the existence of the software. Another crucial aspect is to understand that this is at least as respectable a way of learning as any traditional one to provide proof that it can be very efficient in certain well respected instructional.

Finland emphasises the effective teacher training including the commitment of the whole school society. The school must have an active and supported role when defining the pedagogical goals and best practices in changing educational culture. The new learning and teaching culture needs be supported and empowered at school level by local supportive structures, for example by the pedagogical information strategy teams, the teams of expert teacher, which work in schools and interact also locally and on national level. Also the role of the school head is very important when developing new collaborative methods in a school. The school head should promote the development of pedagogical practices in the curriculum of the school. The technical support for teachers is not enough, the professional pedagogical support in real learning situations in a classroom is needed.

In Italy the committed, enthusiastic and motivated teachers are considered as key actors for successful dissemination. The contacts and collaboration with other schools is also

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very motivating for teachers, peer tutoring might be an effective method for teachers to learn new pedagogical practices. Teachers should also perceive the good pedagogical practices around the Synergeia as a part of the classroom curricula, link them to their daily professional activities. To improve the everyday life, in the Italian school still some organisational problems need to be solved about the access to computers.

According to the Netherlands the best way to disseminate the Synergeia environment is to distribute it through School Advisory Boards and/or Teacher Training Institutes. These institutes are the first ones where the schools will look for new tools or programs. The Netherlands reminds that we must avoid that the Synergeia environment will be only on the shelves of some research institutes, as it may never come off these shelves again.

As a summary when planning the dissemination of new pedagogical practices on collaborative learning developed in the ITCOLE -project the following aspects must be taken into consideration: the practices must be pedagogically meaningful and reasonable, teachers must find them meaningful for their everyday professional activities and to the goals of their teaching. They should be included in the school curriculum and to the educational goals of the school, which have been openly collaborated and defined in a school society. The work must be supported by a committed school head, who empowers change of a teaching and learning culture in her school.

The teacher training must be organised by teacher in-training service organisations, which are able to disseminate new pedagogical practices and give constant pedagogical and user support for teachers. Also local expertise is in a very important role in promoting new practices. Teachers as mentors and peer tutors can act effectively as early adopters in their reference groups. The motivation and enthusiasm of promoting teachers as well as experienced concrete practices effect on their colleagues. Local and school-based supportive structures are needed: for example the information strategy teams of the schools. Also wider national and international networks of teachers interested in CSCL, like euro-cscl Idea Bank of the ITCOLE -project, and active collaboration between teachers and researchers are considered very important elements in dissemination of CSCL. The dissemination needs to be carefully planned and effectively informed with a respect of different European traditions including local and cultural aspects.

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