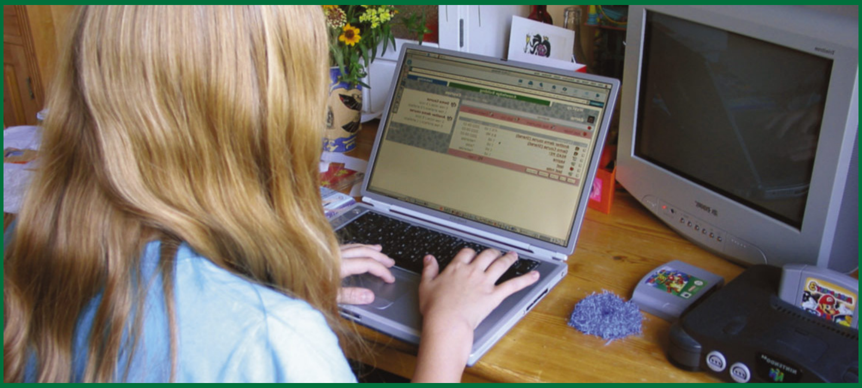
ITCOLE

Innovative Technologies for Collaborative Learning

www.euro-cscl.org



Wilfred Rubens

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Giedre Kligyte

Can deep thinking and collaboration with fellow students increase motivation in the classroom?

"I think I have learned a lot. Mainly I have learned how to think and to collaborate. I also believe that we have gone away from just listening to the teacher in the classroom which was boring sometimes."

Georgia 10th grade (girl)

"I always liked physics and mathematics classes. With Synergeia it was even more interesting. During the class we thought ourselves and analysed the opinions of others. If someone disagreed, he could express his opinions to everybody."

Kostas, 10th grade (boy)

"As for myself I learned to tell my opinion with no fear that it may be wrong. I learned that we all learn from our mistakes. I began to see the Physics course in a different light and to take part in discussions even if my answers were not right."

Archontoula, 10th grade (girl)

Giedre Kligyte

How can a lesson in physics with no spectacular displays receive a nearly unanimous acceptance from the students? Why did students not get bored with such material for three school hours? Can mechanics be so exciting?

These remarks belong to students that have participated in an innovative CSCL project. They express the enthusiasm shared by the whole class which participated in the project. The subject matter had to do with physics of a flight of a coin that is thrown upwards. The students had to arrive at an agreement on the magnitude and evolution in time of the resultant force that acts on the coin. The activity lasted three school hours and was realized by 25 students from the 10th grade of a Greek public school.

A New Dawn for Collaborative Learning in Europe

Computer Supported Collaborative Learning (CSCL) is set to play an increasingly important role in education. In the field of learning science and research on education the CSCL is seen as one of the most promising pedagogical paradigms. With the increase in research, CSCL practices are increasingly implemented in schools across Europe. The idea that meaningful learning takes place primarily in communities is widely acknowledged in the field of learning science and research of education. Also the idea that knowledge is not static but situated in teams, organisations and social networks is widely accepted. During the e-learning boom hundreds of conference systems, learning management systems and virtual learning environments have been developed. However, most of all these environments have been designed to manage study materials, students and their cooperation rather than engage in active learning and knowledge building. Besides this e-learning applications are in general very expensive for schools and other educational institutes.

The ITCOLE project tried to meet the need for specialized CSCL and knowledge-building environments that are designed to facilitate collaborative knowledge building within a local or virtual learning community. In such communities the users neither merely deliver knowledge nor are they just skimming or 'surfing' through knowledge; they are active participants in the process of knowledge creation.

A special characteristic of the ITCOLE project is that both the pedagogical models and the software tools developed are distributed free of charge for the European educational landscape. This enables schools and other educational institutions to test and experiment with the system at minimal cost. The use of open standards ensures compliance with other systems and access to source code makes it possible to extend the system to tailor specific user groups.

The pedagogical models are published and the software tools are available for schools, without license costs (mostly Free Software released under Open Source GPL licence).

Supporting Learning in Knowledge Society

As the use and integration of networked technologies increases, very rapid and deep changes will occur in the realms of society, economics and technology and new skills and competences will be needed in working life. The changes will have long-term effects comparable to the major points in the history of human civilization, such as the agricultural revolution or the first industrial revolution. It is impossible to predict these changes accurately, but based on the most advanced working life practices and visions we can outline some trends in the ways work is changing and assess the competence requirements related to these changes.

Profound changes in the work cultures and professional and technical competencies are connected with the rapid growth of the high-tech industry, the emergence of a digital and global economy and the revolutionary developments in information and communication technology (ICT). Rather than working within a stable community, relying on permanent networking connections and exploiting once obtained professional competence, people are required to function in rapidly changing communities, to actively keep up with dynamically changing network connections and to repeatedly take part in educational activities. There are new things to learn all the time in order to remain professionally competent. Work in organisations is increasingly becoming structured in teams and groups supported by technology, and characterized by distributed expertise and activities that add value of knowledge rather than just produce physical goods. In group work activities, competence and expertise can no longer be described as the personal skills of individuals. There is a growing reliance on the collaborative expertise of teams and networks, of socially shared cognition and capability.

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In knowledge society competence and expertise can no longer be described as the skills of one individual only, but are instead relying on the collaborative expertise of teams and networks, a socially shared cognition and capability.

In order to answer the challenges of the knowledge society many believe we have to bring about fundamental changes in the whole pedagogical philosophy of the educational system.

New Pedagogical Models and Technology

As a consequence of the changes in modern societies, educational institutions and knowledge organisations are required to find new models and practices for facilitating the creation and sharing of knowledge as well as dynamic development of expertise.

In order to answer the challenges of the knowledge society, many believe we have to bring about fundamental changes in the whole pedagogical philosophy of the educational system. Rather than defining some specific desirable skills, educators need to adopt new ways of thinking about skills and competencies, as well as working with knowledge, and in making these epistemological changes also available to students. In order to obtain skills required in this kind of activity, it is important that students learn to work with knowledge in the same transformative way that experts do. Several researchers have proposed that in order to facilitate higher-level processes of knowledge creation in education, cultures of schooling should more closely correspond to cultures of scientific inquiry. This includes contributing to collaborative processes of asking questions, producing theories and explana-


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The knowledge society should not be only for those who are pursuing the edge of knowledge, competence and their own capabilities. The knowledge society should be inclusive, taking into account all people and their differences. A digital divide in the society cannot be accepted.

tions, and using information sources critically to deepen one's own conceptual understanding. In this way, students can adopt scientific ways of thinking and practices of producing new knowledge, not just exploitation and assimilation of given knowledge. Practices of problem-based inquiry supported by collaborative technology appear to be an especially promising way to develop teaching and learning methods with information and communication technology.

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ITCOLE

Innovative Technologies for Collaborative Learning and Knowledge Building

What is ITCOLE?

ITCOLE means "Innovative Technology for Collaborative Learning and Knowledge Building". The ITCOLE project has focused on developing innovative pedagogical models, design principles and technology for collaborative knowledge building to be used in European education. The ITCOLE-project was supported by the European Commission's Information Society Technologies programme (IST) as part of the 'School of Tomorrow' thematic action line. The models and technology have been tested and disseminated throughout the European education landscape free of charge in order to help in building a coherent and unified network of participants that supports sharing of expertise, content, practices and tools. The project has developed a network spearheading the use of collaborative learning technology by utilizing pedagogical best practices.

ITCOLE consortium

Design and Coordination

- University of Art and Design Helsinki, Media Lab

Technical Developers

- Fraunhofer Institute for Applied Information Technology (FIT)
- University of Murcia, Department of Computer Science

User / Developer

- Helsinki City Education Department

Pedagogical Research

- University of Helsinki, Centre for Research on Networked Learning and Knowledge Building, Department of Psychology
- University of Amsterdam, Faculty of Social and Behavioural Sciences
- University of Salerno, Department of Educational Science
- University of Rome La Sapienza, Dep. of Psychology of Developmental and Social Processes
- University of Athens, Department of Philosophy and History of Science, Cognitive Science and Educational Technology Laboratory
- University of Utrecht, Department of Education

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ITCOLE project focuses on developing innovative pedagogical models, design principles and technology for collaborative knowledge building to be used in European education.

The first stage of the project included reviewing the state of the art in CSCL practices and tools, generating practical pedagogical models for the use of CSCL tools and refining them into a set of best practices. The second stage of the project involved implementing the first working prototype for a next generation CSCL system that enabled collaborative knowledge building according to the best practices. The prototype was tested, evaluated and improved through several development cycles in order to arrive at a highly usable, robust and scalable multi-user knowledge building environment to be used on the web. The third stage work consisted of evaluating the software tools and pedagogical practices in various schools around Europe in order to find the best match between innovative local practices and the designed software and pedagogical models. This phase resulted in further refinement and development of the learning environment (the software and related practices) fusing it with the findings of the evaluation and benchmarking phase. The final stage work aims at disseminating the software and practices widely and free of charge throughout European schools. For dissemination the project has build a self-sustaining online community of practice, euro-cscl.org, that will continue to use, develop and disseminate the tools and practices.

The project consortium is made up of pedagogical, technical and design partners. High level pedagogical expertise as well as active practitioners of education with tight connections to teachers and schools have been brought to the project via the pedagogical partners. The technical partners, with earlier experience in developing computer supported collaborative software systems, and the design partner's ability to conceptualize the pedagogical ideas as a working software system have ensured the high quality of the software tools developed.

Collaborative Learning and Knowledge Building

CSCL is focused on how collaborative learning supported by technology can enhance peer interaction and work in groups, and how collaboration and technology facilitate sharing and distributing of knowledge and expertise among community members. Whilst talking about computer-supported collaborative learning one typically refers to the acronym CSCL, without speculation about the latter "C" word (the first stands for 'computer') and what it might stand for. The short history of CSCL shows, however, that there have been different interpretations and suggestions for the "C" word such as, collective, coordinated, cooperative and collaborative. Despite the different interpretations of the "C" word, most researchers appear to use it nowadays as one of these three last terms.

Collaboration

Within learning sciences, common to the different definitions of collaboration is that they stress the idea of co construction of knowledge and mutual engagement of participants. In this sense, collaboration can be considered as a special form of interaction. Collaboration can be defined as a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem.

Collaboration can be also defined as a process of participating in knowledge communities. It is a process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to. Several researchers speak about knowledge-building communities.

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Model of Progressive Inquiry

Progressive inquiry is a heuristic framework for structuring and supporting students' epistemological advancement and knowledge building skills. The model relies on recent advancement in cognitive research on educational practices and equally, on a conception of inquiry emerging from the philosophy of science. Shared knowledge advancement requires that students engage in a systematic effort to advance shared knowledge objects - theories, explanations or interpretations. Both of these approaches acknowledge the socially shared character of inquiry. The following elements describe the progressive inquiry process: a) Creating the context to anchor the inquiry to central conceptual principles of the domain or complex real-world problems; b) Setting up students' own research questions; c) Constructing students' own working theories for the phenomena before using information sources; d) Critical evaluation of the produced theories and explanations; e) Searching deepening knowledge using external information sources; f) Generating subordinate questions; g) Developing new more advanced working theories; and h) Distributed expertise, which means sharing the whole process between all learning community members.

Knowledge Building

Knowledge building is a special form of collaborative activity oriented towards the development of conceptual artifacts, and towards the development of collective understanding. CSCL environments provide tools for collaborative building of knowledge. Sophisticated environments designed to support expert-like processing of knowledge by guiding students to work collaboratively to improve shared knowledge objects may be called knowledge-building environments. Through these kinds of environments, students may be guided to engage in productive working with knowledge objects in the same way as the scientific community is engaged with theory improvement.

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Progressive inquiry entails that new knowledge is not simply assimilated but constructed through solving problems of explanation and understanding.

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Problem-based Learning

Problem-based learning is an approach where a curriculum is problem centred rather than discipline centred. Problem descriptions, as concrete and as authentic as possible, are used to focus self-directed study and to motivate students to find relevant information. A problem-based curriculum differs from the traditional subject-based curriculum in the following respects:

- *Cumulative learning* - a subject is not learned in depth at any one time, but is introduced repeatedly and in increasing levels of complexity during the course of study.

- *Integrated learning* - subjects are introduced as they relate to a problem rather than separately.

- *Progression in learning* - what and how students learn changes as students acquire skills and knowledge and as they mature.

- *Consistency in learning* - the aims of problem-based learning are reflected in all aspects of teaching and learning, including the learning environment in the classroom and assessment practices.

Students use their existing knowledge in order to learn rather than being treated as a tabula rasa; the process of enquiry fosters self-directed learning; and students 'learn how to learn' so that they are better able to apply problem-solving to new situations. Students work in groups on authentic problems. They often use a proces of seven steps to work on a problem:

- *Clarification of terms*. Students check if they understand what the problem is.

- *Defining problems*. Students formulate relevant questions they have to answer.

- *Problem analysis*. Based on existing knowledge, students formulate ideas and hypotheses.

- *Structuring and elaborating existing knowledge*.

- *Formulating goals for learning*. Students discuss about the kind of knowledge that needs to be constructed and what they will study.

- *Finding relevant information*. Students gather information that meets the goals for learning.

- *Restructuring information and reporting*. Students present the findings in their own words and discuss the outcomes.

Community of Learners

Computers and networks can be used to develop and sustain communities working at a distance. The community of learners model based on co-constructivist and collaborative ideas gives interesting suggestions how to increase the number of actors interacting around the same task and how to foster development of higher levels of thinking. Computers and networks are used to increase the number of communication partners, thus to have larger community than just one classroom.

It should be taken into account that learners often see computers as tools for individual activities and forget about the collaborative aspects. Community of learners approach invites us to see computers as tools for discussions and collaborative strategies planning.

Conceptual Change, Shared and Individual Regulation Process

Changes in existing conceptual structures are difficult to achieve, because of their complexity and of their counter-intuitive nature. Students are often unaware of fundamental presuppositions that constrain their understanding of scientific explanations or take these presuppositions to be fundamental truths about the physical world that cannot be questioned (such as, for example, the belief that space is organized in terms of the directions of "up" an "down" or the belief that unsupported objects fall down). An important goal of science instruction is to make students aware of their ideas and beliefs and also to make them understand that these beliefs are not unique. Understanding that your beliefs can be tested and sometimes that they can be falsified, understanding how to use evidence to evaluate a theory and how to revise a theory in light of disconfirming evidence, are fundamental to understanding science. The development of this metaconceptual awareness in students is very much related to the more general problem of creating intentional and purposeful learners who can take control of their own learning, know how to learn and how to correct their mistakes.

Collaborative work leaves students open to strong social influences that have the potential to "shake" their convictions (by experiencing a variety of alternative opinions), question their sense of understanding (through social pressure when in the minority), and create both contexts of conflict and needs to reach agreement in order to stream operations. Through all these experiences students realize a multifaceted reality in which different opinions can be reasonably supported and challenged and where different forms of resolution have to be tried out to achieve some result they can be proud of. The use of computers has the additional advantage of stabilizing information and opinions in a written form and structuring communication so that multiple discussions can be well organized (i.e. the tree structure of the knowledge building area in Synergeia). In this way, affordances for metacognition created in a collaborative environment can be taken full advantage of, allowing students to think deeper on their own timing, and the teacher to make appropriate comments either to guide interaction or to provide the norms of the discipline under study.

Computer Tools for Collaborative Learning

An important result of the ITCOLE-project was the development of a modular knowledge-building environment to support collaborative learning. In fact, three tools for collaborative learning were developed, evaluated and tested.

Synergeia

Synergeia is an extension of BSCW. BSCW (Basic Support for Cooperative Work) enables collaboration over the Web. BSCW is a 'shared workspace' system which supports document upload, event notification, group management and much more. Built on BSCW, Synergeia adapts this system of shared workspaces to create virtual places for learners to work and collaborate in groups. The Synergeia software consists of two components:

- The asynchronous communication and collaboration software: BSCL (Basic System for Collaborative Learning).
- The synchronous communication and collaboration software: MapTool and Instant Messages.

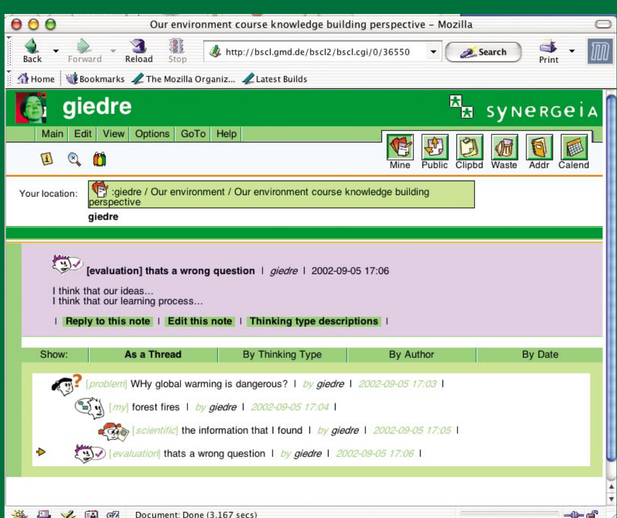
The software can be found at http://bscl.fit.fraunhofer.de, the Synergeia server for the ITCOLE project run by Fraunhofer FIT, Germany.

BSCL is explicitly designed to support collaborative learning and knowledge building according to the progressive inquiry model. This pedagogical concept focuses on asynchronous, textual discourse, which fosters reflection, critical thinking and joint knowledge building. The threaded discussion facility of BSCW has been re-designed and enhanced with a flexible system of thinking types to make the character of the notes and their relationships more explicit for the students. A knowledge building functionality has been developed. You can find more information of the use of thinking types below, in the description of FLE3.

As an initial synchronous tool, MapTool has added a drawing facility that allows a group of students to work together in order to construct a conceptual map of the ideas they are exploring. A synchronous chat stream is maintained as an integral part of the multi-user drawing tool in order to support the co-ordination of work. This brochure contains a separate section about Maptool.

With BSCL, teachers have many options for structuring the virtual learning environment used by their students in various educational activities. They can also choose among several sets of thinking types in different knowledge building areas. Students can also use many features to structure their own group work. To provide a more personal appearance of the computer screen, photos of the students are prominently used to indicate whose workspaces or remarks are displayed.

In addition to the standard awareness features of BSCW – like the extensive history reports – BSCL displays lists of all members of a folder, with indications of each member's level of activity, for example, whether they are using synchronous tools at that time.



http://bscl.fit.fraunhofer.de

Three perspectives

In BSCL learning places are typically arranged as a series of perspectives:

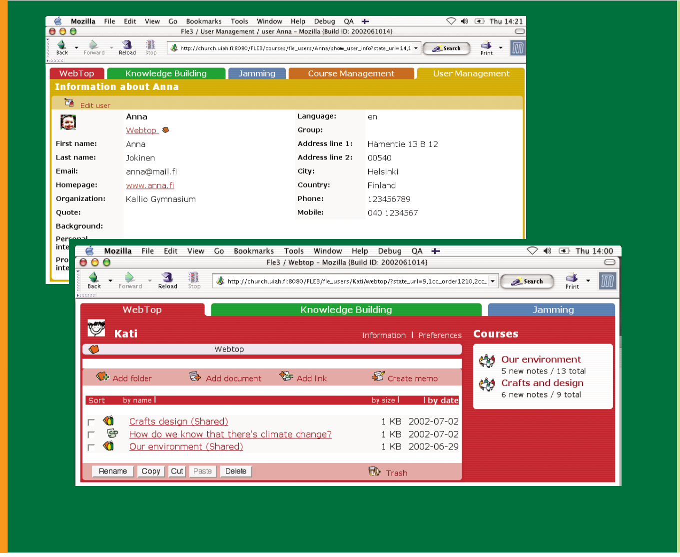
- *a personal perspective* in which a student can develop his or her own initial thoughts and assemble ideas from others or materials from the Web;
- *a group perspective* that is shared in a workgroup;
- *a course perspective,* where ideas and materials can be discussed with all course participants.

The perspectives have special features and access rights to help them work naturally in school settings without putting a major burden on teachers to design and set up such structures.

Course and user management

In the typical working scenario of Synergeia teachers register their students or other colleagues to the system. They create courses and enroll the students to these courses. In a course the teachers could form working groups among the enrolled students. In a group a teacher may setup some initial discussion for knowledge building. If students are logged in to the system, they will see their home area with their personal perspective and the courses in which they are enrolled. In a course they will find the working groups, in which they have to perform their knowledge building tasks. By entering a group they can join or start a discussion for knowledge building. They may also start or join a MapTool session to explore their ideas synchronously in a conceptual map. If they are finished with their tasks, the students can copy their results in the course perspective to present these to or discuss these with their course members.

http://fle3.uiah.fi



Fle3

Fle3 is a web-based learning environment. To be more specific Fle3 is a server software for computer supported collaborative learning (CSCL). Fle3 is designed to support learner and group centered work that concentrates on creating and developing expressions of knowledge (i.e. knowledge artifacts) and design.

The software can be found at http://fle3.uiah.fi, from the Media Lab at the University of Art and Design Helsinki. Fle3 contains three learning tools and several administration tools.

WebTop

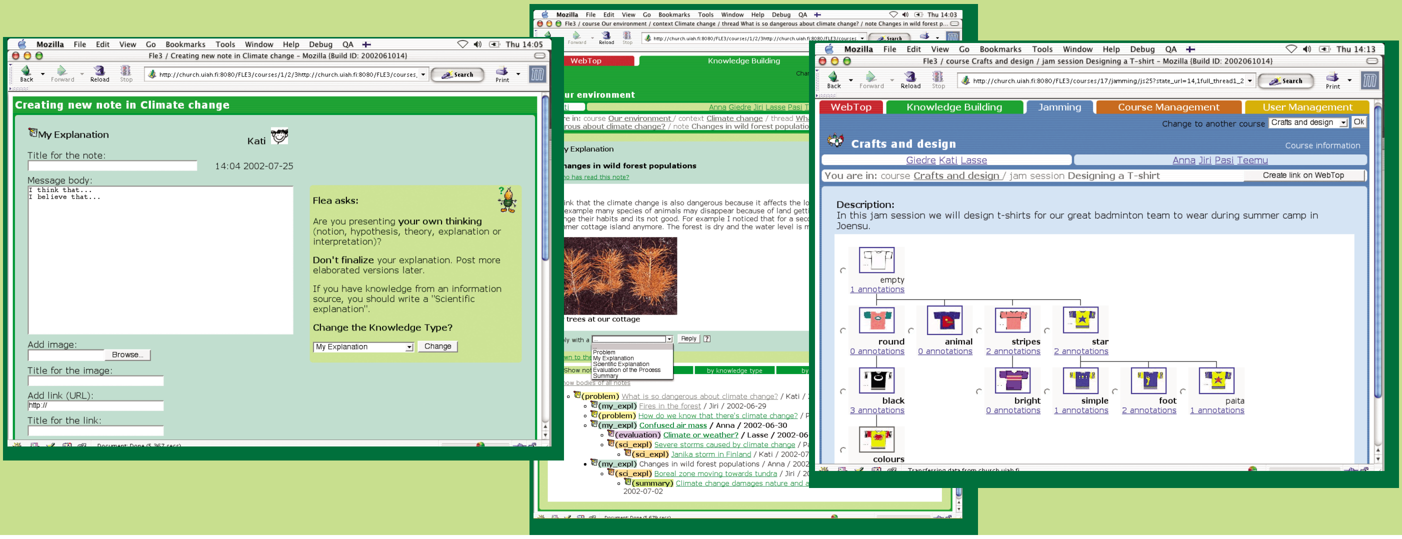
Each user of Fle3 gets a personal WebTop. WebTops can be used to store different items (documents, files, links to resources in the web, link to knowledge building notes and jam session artifacts) related to the studies or project and organize them into folders. The items in the WebTops are shared with other users in the same course or project, as users may visit each other's WebTops.

Only the owner of a WebTop may create, edit and remove items in her WebTop, but visitors may read the items. The WebTop also includes a shared "course folder" for each course or collaborative project. The shared folder is available in the Knowledge Building and Jamming, modules as well.

Knowledge Building

With the Knowledge Building tool, groups may carry out knowledge building dialogues, theory building and debates by storing their thoughts into a shared database. The knowledge building discussion is scaffolded and structured by knowledge types, which label the thinking mode of each discussion note. The Knowledge Building tool contains two default "knowledge type sets": (1) Progressive Inquiry, and (2) Design Thinking. Fle3 Users with enough user rights may also copy, edit and create new "knowledge type sets" to the system. Depending on the knowledge type set selected, users are prompted with guidelines and checklists to write their notes to the database.

The Progressive Inquiry knowledge type set contains the following knowledge types: Problem; My Explanation; Scientific Explanation; Evaluation of the Process and Summary. The knowledge types scaffold (support and lead) students to carry out research-like activities, which deepen their understanding of the area under study. The complementary knowledge type set made for collaborative design contains the following knowledge types: Design Context; Design Challenge; My Design Idea; New Information; Evaluating an Idea; Organizing the Process and Summary.



The system offers a checklist explaining to the participants what kind of things the note should include in order to advance the process, when writing their contributions to the knowledge building section. For instance when writing New Information –note in design knowledge building the Flea "agent" asks from the author:

"Does the note present some new information related to the design task? Remember to mention the source where you got the new information:

- by interviewing users
- by analyzing the design context?
- studying earlier design solutions of others."

The knowledge type sets guide students to consider adequate and important things related to the process and, in this way, helps students to write more significant notes to the database. As an aid for helping users to follow the knowledge building discussion, users may take different kind of views to the knowledge building database by sorting the notes as a discussion thread, by writer, by knowledge type or by date. With the advanced search engine users may also search the knowledge building database in many different ways.

Jamming

The Jamming tool is a shared space for collaborative construction of digital artifacts (pictures, text, audio, video). A study group may work together with some digital artifacts by simply uploading and downloading files. Versions are tracked automatically and different versions are displayed graphically. Users may also add annotations to artifacts. When setting up a jam session the tutor may choose from three types of jam sessions; (1) "mutate on previous" or (2) "explore possibilities" and (3) "diverge and converge". This gives the users slightly different possibilities to make new versions and to make references to earlier versions. Originally the Jamming tool was designed (to be used) for visualizing ideas in a group. However, it has been noticed that Jamming could be used for many different kinds of collaborative design work that requires versioning. The artifacts under process can be text, picture, poster, music, video, animation, multimedia or a piece of software.

Course and User Management

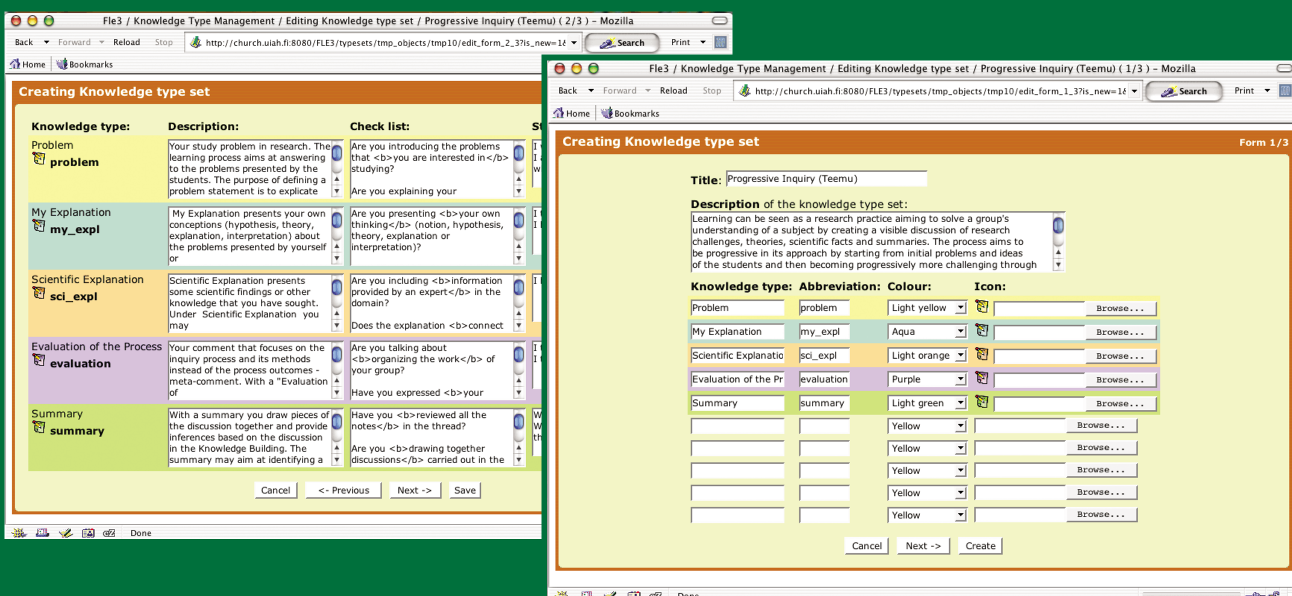
The staff and teachers taking care of the courses and course participants have tools for managing users, courses and participants of the courses. With the user management tools staff users may add new users manually or by inviting them via e-mail. With the course management tools staff users may add users to courses with a role of being 'student', 'tutor' or 'teacher' in that particular course.

Furthermore staff users may manage the knowledge type sets, create new ones, copy and edit existing ones and export and import them between Fle3 systems.

The staff users may also import and export courses in XML format, compatible with the Educational Modelling Language – EML defined by the Dutch Open University. In the same way the administrator of the Fle3 server may export the whole database in XML and import the package into another Fle3 server.

Fle3 is easy to localize for different languages, requiring only the translation of one text file. Currently users may choose Danish, Finnish, English, Spanish, French, Portuguese, Brazilian Portuguese, Norwegian, Dutch, Italian, Lithuanian or German as their user interface language.

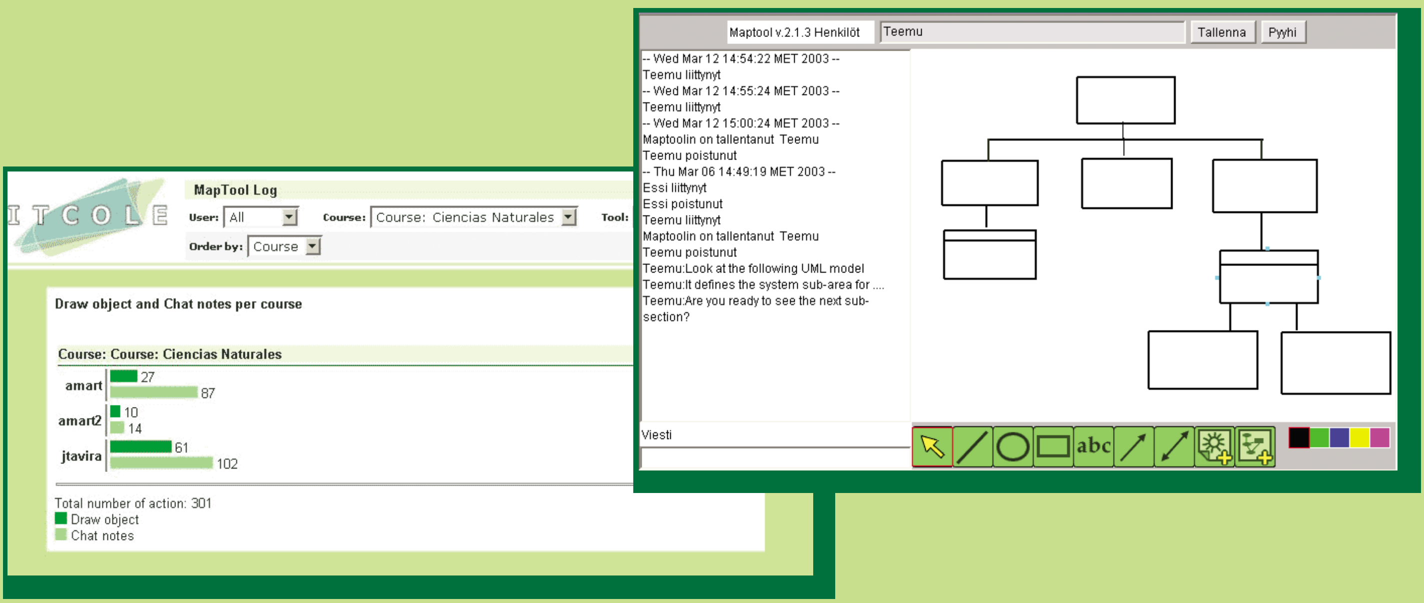
Fle3 is Open Source and Free Software released under GNU the General Public Licence (GPL). The licence is protecting users freedom to use, modify and distribute Fle3.



MapTool

The MapTool consists of a whiteboard for collaborative drawing of concept maps. When drawing maps together students may also chat. The drawing tool facilitates both collaborative creation of conceptual maps and diagrams and synchronous textual communication among students participating in the same study project. It allows drawing lines, basic shapes, arrows and importing images from a local computer. All figures and images can be connected using lines and arrows. The tool also shows a list of connected users and telepointers showing who is collaborating in the drawing area. If a user comes late to the session, she can retrieve the previous events.

The MapTool is a one application of the synchronous system called Ants. In order to integrate easily some synchronous and asynchronous tools on top of the Ants system there is a common API (Application Programming Interface). The API is used to facilitate the communication from the tool to the communication channel and enables the integration of different tools with different systems such as Synergeia and Fle3.



http://ants.dif.um.es/cscl/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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.

Support in Using CSCL in Everyday School Life

The reflections of researchers in different European countries show 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 different software. However, still the practices that prooved to be useful are very rarely become part of everyday school life.

Change of the school culture is slow and challenging. The earlier attempts to promote CSCL have been very technology-centric in nature. They relied on assumptions that CSCL is mainly supported by developing technology. Based on the earlier experiments we now know that change is needed not only in the technical infrastructure, but also in pedagogical-, social and epistemological infrastructure. The required technical infrastructure means that teachers and students have access to new technology and they have sufficient skills to use it. The pedagogical infrastructure include 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. Social infrastructure refers to new technology as an integrated aspect of core 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 means 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. In many schools one or several of these are missing. In most cases the

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challenges are to develop suitable pedagogical and social infrastructure.

Teacher training and consulting that pays special attention to pedagogical and social infrastructure is one way of approaching a solution to this challenge. It seems to be obvious that providing schools with technology and training teachers in the use of basic software is not enough. 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. The key questions are what added value and new elements information and communication technology bring to teaching, studying and quality of learning.

In practice teachers should be supported in developing pedagogical practices of computer supported collaborative learning with pedagogical researchers. Teachers should be encouraged to participate in 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, practical cases 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.

Teacher Training and Consulting Model

To facilitate school administrators, headmaster and teachers willing to introduce CSCL activities in schools the ITCOLE project has developed teacher training and consulting model. The dual model contains both, traditional workshops and virtual learning in CSCL environment. The training and consulting model is divided into four stages each closely linked to each other. The stages are 1) Orientation, 2) Action, 3) Assessment and reflection and 4) Dissemination. Training is emphasized on the first stage of the model and consulting on the second. The idea of the model is to introduce new pedagogical models and software tools for teachers and simultaneously implement them in use in class rooms by relying on teachers own teaching and project ideas. Full description of the model is available at: http://www.euro-cscl.org

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Published and In press -publications

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Community web site

One important deliverable of the ITCOLE-project is http://www.euro-cscl.org/. This web site serves as a community site and resource of information for practitioners (teachers), researchers and school administrators in Computer Supported Collaborative Learning (CSCL) field. Here you can find news and best practices from CSCL community, links to CSCL research, information about CSCL software tools and have discussions with other members of the community.

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