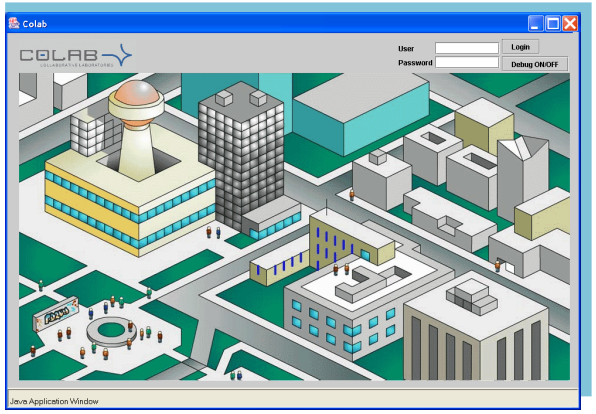
Co-Lab

Collaborative Laboratories for Europe

Co-Lab provides a new Web-based environment for collaborative inquiry learning. In the Co-Lab shared workspace, learners perform experiments, discuss their findings, consult background literature, and construct and evaluate models. For each of these processes, support tools are available in the environment to foster and enhance learning. Co-Lab is particularly suitable to promote inquiry learning in the natural sciences at the upper secondary level and the first years in university.

Why use Co-Lab

Co-Lab provides strong support for an inquiry-based pedagogy. While inquiry learning is widely advocated, the lack of advanced resources and support has often hampered successful classroom implementation. Co-Lab also supports student collaboration. Students from different schools, or even from different countries, can work together on scientific problems. Collaboration can take place during classroom hours, but students can also continue their Co-Lab session at home. Co-Lab further offers access to remote laboratories where students can work with equipment unavailable in school.



Curriculum materials

Co-Lab is designed for learning in the natural sciences at the upper secondary level and the first years in university. Content is available for four domains: water management, greenhouse effect, mechanics and electricity. For each of these domains, Co-Lab offers remote labs, background literature, teacher manuals and student instructions.

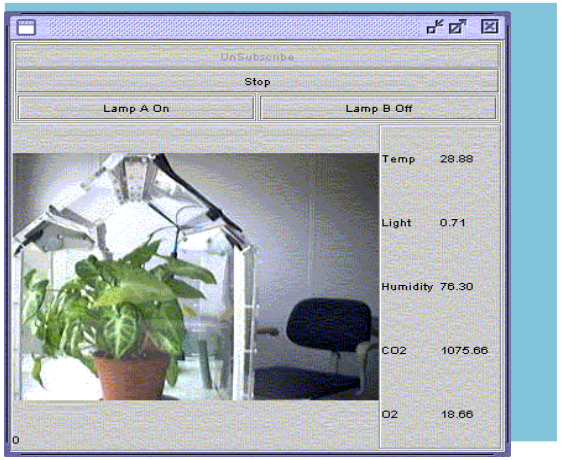
Water management and greenhouse effect are extensive courses that cover the richness of these interdisciplinary domains. Each course comprises several modules of different levels of complexity. Some modules are mainly physics oriented; others are more geared towards chemistry or biology. Depending on the number of modules taken, students spend 10 to 30 hours on a course. The electricity and mechanics courses are less extensive, requiring about five hours of student time.

Pedagogy

Students develop a deeper understanding and a stronger involvement if they discover new knowledge themselves. Inquiry learning further enhances students' self-regulated skills that are indispensable for life-long learning.

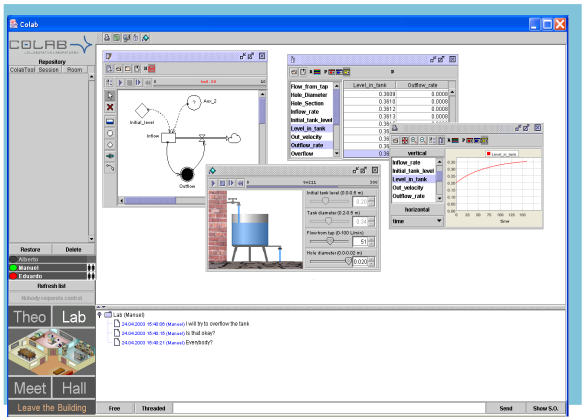
Despite these apparent benefits, students are unlikely to make all the significant discoveries on their own. The instructional efficacy of inquiry learning environments therefore hinges on its ability to guide students throughout the learning process. Co-Lab includes both overt and covert mechanisms to provide such support.

- Collaboration prompts students to explain their thoughts, which helps to make reasoning more precise and to uncover misconceptions.
- Students' understanding of a domain is further enhanced when they can express their ideas in an artefact. In Co-Lab, students can use the Modelling Tool for this purpose.
- Students need guidance in planning, monitoring and evaluating their inquiries. Co-Lab's Process Coordinator Tool supports students in performing these self-regulatory skills. The Report Tool helps them to reflect on their learning outcomes.



- Students cannot discover everything they need to know from experimental data. Co-Lab therefore enables them to consult dedicated background information using the Viewer Tool.

With these support measures, students can regulate their own learning process without much teacher support. An occasional hint from the teacher is of course helpfull, but the teacher's main role is to lift student learning to a higher plane. Through classroom discussions, teachers can (p)review modules to relate Co-Lab content to prior knowledge, other modules, and expert behavior.



System requirements

Co-Lab is fully JAVA-based client-server software. The client software is platform independent, and can be run from any JAVA Webstart enabled machine without further installation. On a Microsoft Windows platform, requirements are a Pentium III at 800 MHz with 512 MB working memory and 1024 x 768 screen resolution. The server software can be installed on a local machine in the school, or users can login to one of the Co-Lab project servers. In case of a remote server, DSL or better Internet connection is needed.

Key features

Integrated tool suite for inquiry learning *Data collection:* Remote labs (including web cam), Simulations, and Databases. *Modelling:* Quantitative and qualitative dynamic modelling tool. Visualisation: Graph Tool, Table Tool. *Idea writing:* Graphical Whiteboard. *Collaboration:* Chat Tool, Control Tool (keep track of who is doing what, and prevent interference between learners' actions). *Background info:* HTML Viewer. Process support: Process Coordinator and *Report* Tool.

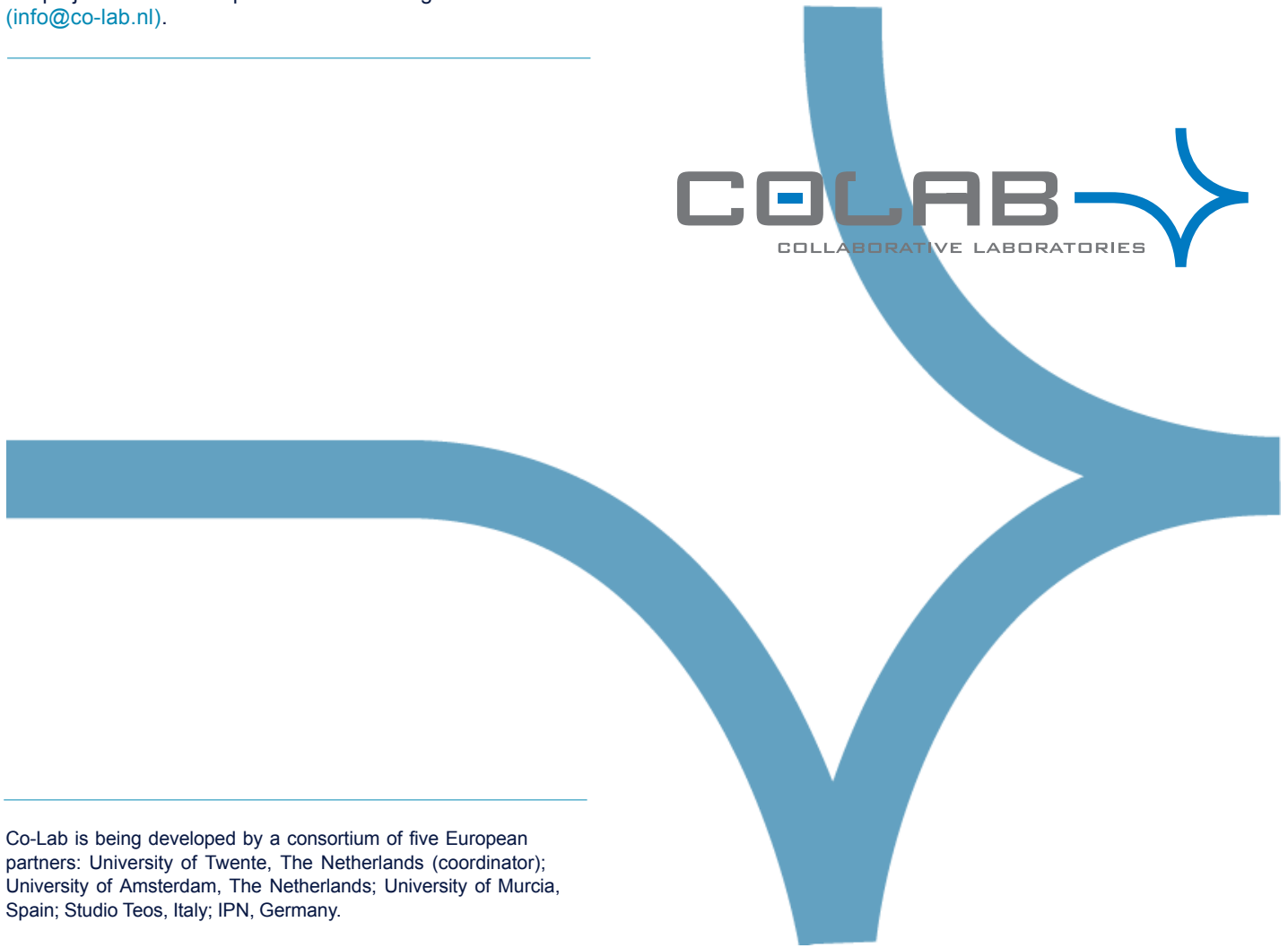
Web based Collaborate at a distance with students in different locations; connect to laboratory equipment in different institutions.

Customisable New content can easily be added, and the layout of the environment can be fully adapted through a simple set up tool, using XML and HTML.

Open source The Co-Lab software and source code will be available free of charge.

Availability and contact information

For further information on the project, or to get access to the Co-Lab software and the Co-Lab content materials, visit our website at: www.co-lab.nl. You may also contact the project coordinator: prof. dr. Ton de Jong (info@co-lab.nl).



Co-Lab is being developed by a consortium of five European partners: University of Twente, The Netherlands (coordinator); University of Amsterdam, The Netherlands; University of Murcia, Spain; Studio Teos, Italy; IPN, Germany.

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