# Project-based Learning with CommSy

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## ABSTRACT

Project-based learning has long been an important element in teaching informatics topics, because it allows students to acquire important social and methodological competences in addition to professional competence. Groupware systems are increasingly used in such settings. In our paper, we present the didactic concept we have applied to more than ten cooperative educational projects over the last few years. We describe how electronic media have become an integral part of our concept and we introduce *CommSy* a web-based application, designed specifically to fit the needs of project-based learning.

### Keywords

Project-based learning, learning communities, community system, CommSy

## INTRODUCTION

Current work practice in the IT industry is characterized by cooperative work in small multidisciplinary teams. Therefore, social and methodological competences gain importance compared to professional competence, i.e. knowledge in a subject area. Obviously, those competences cannot be learned individually in lectures or traditional seminars, but require practice and being engaged in a real-world context. We address this problem by offering cooperative educational projects to our students with a didactic concept that focusses on authentic work practice. With the interdisciplinary mixture of students in our classes, the high number of "part-time students" (working a lot beside their studies) and the geographically dispersed campus of the University of Hamburg, our organizational setting suggests itself to the introduction of a groupware system into our didactic concept. Furthermore, by using electronic media in our educational projects, students can learn how to use computers to push their work and to communicate with their fellow project members.

## PROJECT-BASED LEARNING

Our didactics for project-based learning is based on Dewey's (1966) educational philosophy. The following principles form the basis of our didactic concept:

- *Cooperative construction of a task:* Together with the students, we construct their task within a broad area given by the subject of the course. To be educationally valid, the task should be both, enjoyable and of practical relevance, and it must be demanding and provoke the desire for more information.
- *Teamwork:* The students work on the chosen task for the whole term. They organize their work processes themselves, and they have to thoroughly document their work process and their findings. Usually project teams are formed in groups of three to five students, to work on different aspects of the task.
- *Plenary sessions:* Weekly plenary sessions are used to handle organizational tasks and to reflect on the work process as well as for invited talks on relevant topics, for teaching basics, and for presenting preliminary findings. At the end of the term, the project group presents its results to a larger audience. Presenting results fosters a process of mutual teaching and learning among the students (Brown et al. 1993).
- *Coaching the learning process:* As teachers, we take on the roles of "coaches." Our job is to set the conditions and to give impulses to the project work.

According to Bastian and Gudjons, two activities are central to project-based learning:

- *Communication* plays a major role, because successful communication is the basis for all social interaction. That is coordinating team-work, negotiating positions and responsibilities within the team, sharing one's own perspectives on a given problem with other team members, and so on.
- The *handling of working material* is important, because a proper selection and rating of information sources is the basis for any informed decision made within the project. The presentation of work results in the form of new working material (e.g. reports) are the foundation for further project work.

## SOFTWARE SUPPORT FOR PROJECT-BASED LEARNING

Software used in an educational project should support these central activities of project work. Therefore it should provide a means of computer-mediated communication, to allow students to discuss their topics without the plenary sessions. Information that should be shared by technical means are a list of the relevant literature, announcements, and other working

material. Together with colleagues, we applied our didactic concept to more than ten projects over the last years. Computer support was first introduced in our projects by a mailing list as a tool for coordination and a shared directory to distribute documents. Later, we used Lotus Notes and Swiki in some projects and considered other tools as well. To better support our didactic concept with a software tool, we developed the web-based system *CommSy* as a suitable solution and found that it fits our needs more adequately.

*CommSy (*See http://www.commsy.org for more information on *CommSy* and our work) stands for *Comm*unity *Sy*stem and is a web-based system to support communication and coordination in project groups. *CommSy* supports communication in multiple ways: News and events can be announced, in a discussion forum, specific topics can be discussed, each member has a personal homepage to present him/herself to the group, and annotations can be made to every item in *CommSy*project room. Working material can be collected in a simple reference manager and put in context by attaching them to any other item (e.g. an announced event). A group-editor is available for cooperative writing of HTML documents. The following design principles distinguish *CommSy* from other software products:

- *Easy individual use:* Enabling individuals to easily use *CommSy* is a prerequisite for any project member to actively engage in the work without having to overcome technical barriers. We achieve this by implementing only required functionality and a simple structure across the whole system.
- *Transparency in cooperative usage: CommSy* gives special emphasis to user communities rather than individuals: *CommSy* is exclusively accessible to members of a certain group and each user's name is recorded with every item s/he creates. Every project room can be customized to help build a group identity.
- *No concept of roles:* "Ownership" is the sole access right in *CommSy*. Only the owner of an item may modify or delete it. Apart from this rule, every member of a *CommSy* is allowed to do everything and to see everything. There is no distinction between students and teachers. By that, *CommSy* reflects social manners we promote in day to day interaction with our students, like self-responsibility and commitment.

## DISCUSSION

Introducing software to educational projects is a significant intervention in learning processes, it must therefore address the needs determined by the didactic concept. In the projects we offered to students during the last two years, we found that the use of *CommSy* is indeed a significant enhancement of our didactic concept. But the sole availability of a good software tool does neither automagically result in the sensible use of the software nor any use at all. It is important to negotiate conventions of software use early within a project. This is eased by the given structure of *CommSy*, but still one has to decide, for example, how often project members want to read new items or in which file format documents should be uploaded so that everyone can easily read and write them. In addition to those group-decisions, one has to individually judge the relevance of one's own items and how to present them to the group. We found that students reflected much more on their communication practice after the introduction of software, because it became an explicit topic. It was quite common, that new conventions and use practices were invented by them. Also, the project work was pushed ahead, because students had access to the working material of their team colleagues earlier, and access to the (preliminary) results of other project teams allowed for a broader insight into the subject area of a project. The work with literature received more attention, because all references were instantly available to all students without a big effort; it was thus attractive to add new references to the pool.

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