From environmental information systems to social networks: fostering co-operation in the ETH-UNS Case Study for sustainable regional development

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Abstract

The ETH-UNS Case Study is part of the master program in Environmental Sciences. It is a hybrid combining *teaching, research, and application*. Joint problem solving between science and society is a major principle of our work. In our view, such approaches are a prerequisite in developing strategies towards a sustainable society. However, this requires improved organization of knowledge, co-operation of work and communication among all people involved. Co-operation and communication is needed at least (a) within and between the different study teams, (b) between the study teams and local agents and (c) among local agents with a view to sustain local social networks.
Since its beginning in 1994, the ETH-UNS Case Study has used a broad set of IT-tools to support co-ordination, communication and co-operation of work. Starting form a incomplete peer-to-peer system, we advanced to a centralized file sharing system, and are now embarking into an integrated, dynamic network approach. A new web-based information system, named «living document», will be updated and supplemented continuously. The «living document» will support group work, communication among participants from inside and outside university and co-ordination of activities.

1. The ETH-UNS Case Study: transdisciplinary approaches to support social networks in sustainable regional development

Within the five-year master program in Environmental Sciences at the ETH Zurich, the ETH-UNS Case Study is a compulsory course for all students in the 9th semester, 14 weeks in duration. More than 30 students of Environmental Sciences specialized in different fields (i.e., environmental hygiene, terrestrial systems etc.) participate for 18 hours a week. 16 professors, assistants, and researchers from outside universities are coaching and supervising the students (Stauffacher 2001). The ETH-UNS Case Study is a hybrid combining *teaching, research, and application*. Joint problem solving between science and society (e.g. farmers, residents, companies and

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administration) is a major principle of our work. In contrast to interdisciplinarity, our study goes not only beyond disciplines but also beyond sciences, this research mode being called *transdisciplinarity* (Scholz & Stauffacher 2001). Within the traditional mode of theory-practice transfer a linear model of science-society interaction exists. Society spends money on sciences that generate a reservoir of knowledge. The theory-practice transfer is then organized via applied research or using traditional marketing strategies. This traditional way of problem solving usually leads to a new problem, the implementation problem. We argue that the barrier in the theory-practice relationship can be overcome by transdisciplinarity.

In our view, such approaches are a prerequisite in developing strategies towards a sustainable society. The residents of an area are the problem owners and a sustainable development is only possible integrating their views, experiences and knowledge. It can be shown that innovation and learning processes are necessary to move towards a sustainable development. Such processes depend largely on existing social networks, covering both public and private agents (Laws et al. 2001). Different key facilitative roles can be distinguished in this so-called public entrepeneurship network (PEN: ibid. pp. 4): pioneers, public venture capitalists, superintendents, mediators and stewards of the common goods.

A significant and crucial point in this process is how all participants communicate, co-ordinate and adjust their activities. Such an approach requires improved organization of knowledge, co-operation of work and communication among all people involved. Co-operation and communication is needed at least (a) within and between our different study teams, (b) between our study teams and local agents and (c) among local agents with a view to sustain local social networks. Over the last 6 years, we developed and tested several organizational elements and methods to support transdisciplinarity in the ETH-UNS Case Study (Bösch 2001). It is important to note that they all produce interactions of varying characteristics: both content and main directions of information flow are different. We distinguish three forms of content: information (qualitative), data (quantitative) and contacts (including skills, experiences and knowledge of experts). With respect to direction, we distinguish two main directions: contents mainly stemming from case agents and informing our study teams and in the other way study teams informing case agents. In the next chapter, we will sketch potentials of IT-technologies in supporting these tasks.

2. IT-Tools in the ETH-UNS case study: the «living document» as an integrative environment

Since the first ETH-UNS case study in 1994, we have used IT-tools in our work. Starting mainly with word processing programs and specific individual applications (statistical analysis, simulation programs, etc.). Data was exchanged either by Email or within small peer-to-peer-networks. Later in 1997, we applied a broad set of tools

to support co-ordination, communication and co-operation of work: electronic mail, bulletin boards, decision support systems, databases, file servers, etc. (Figure 1). Bulletin board systems are used to discuss current problems between and within our study groups and to exchange different views on many aspects of project work. Specialized databases exist for addresses, literature and geographical information. E-mail enables fast information exchange, internal and external review of documents and even short questionnaire surveys. Specific information is regularly put on the World Wide Web, making it easy accessible for all persons involved. Decision making processes are supported with specific tools like e.g. Logical Decisions™. Most of the present use of IT-technology focused on internal communication and co-operation within and between our study teams. It was controlled and organized centrally, applying a classical file-server-approach. We gained a lot of experiences with all these tools and have by now a stable running and highly efficient internal information and data management system. Much less effort was spent supporting communication with and among the case agents, i.e. going beyond our internal university based network.

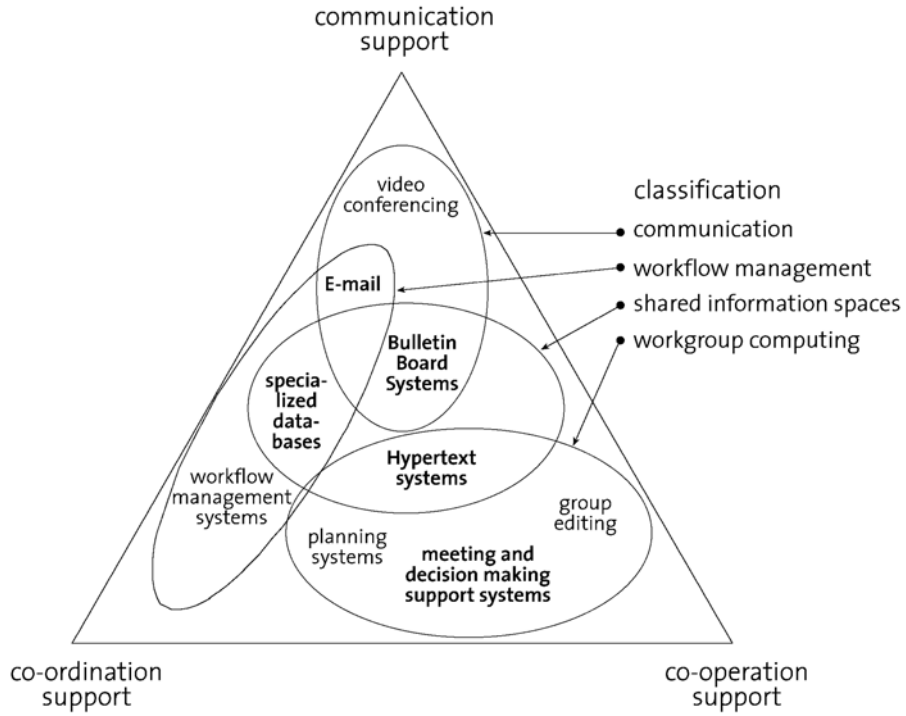

Figure 1: Classification of different CSCW (computer supported cooperative work) applications. Elements in bold were used till 2000 within the ETH-UNS case study (Bösch et al. 1997)

Today, web-based applications gain more and more importance in searching, analyzing and presentation of data and information. The ETH-UNS Case Study furthers its communication strategy towards the Internet and adapts its working methods as much as necessary and useful. Beginning this year, all substantial information will be presented on the Internet. This web-based information system was named «living document», as it will be updated and supplemented continuously. The «living document» will support group work, communication among participants and coordination of activities. Last but not least, it should help in the dissemination of our publications, attracting further target groups, especially on an international level. Referring to our principle of «mutual learning» between science and society, the continuos update will be accomplished in close collaboration with local agencies (e.g. administration).

A meta-database will be the pivotal element of the whole system. Based on standards used in databases for environmental information (see e.g. the Swiss Catalogue of Environmental Data Sources: http://www.ch-cds.ch/), all documents and information will be presented in a fixed format. Electronically available documents will be linked directly. Furthermore, documents produced by our study teams and other external partners will be incorporated continuously and by the end of the project should encompass the majority of the content. Additionally, the «living document» serves as an internal communication system between and among our different study groups.

The aims of this new system are as follows:

1. improved information flow between students, tutors, case study bureau, and our local partners (case agents);
2. higher transparence of the complex working process in many different, parallel running study groups;
3. fast publication of up-to-date data and documents;
4. easy accessibility of all available information;
5. active participation in the project process of case agents and other interested persons.

As such, the new system presents a fundamental shift in the use of IT-technology for our work by crossing the boundaries of the university, in giving case agents not only access to read our documents but to actually add new elements and comment our work. In stead of a centralized file serving system we move towards distributed file serving with decentralized control and organization, i.e. a dynamic and «real» network approach is pursued.

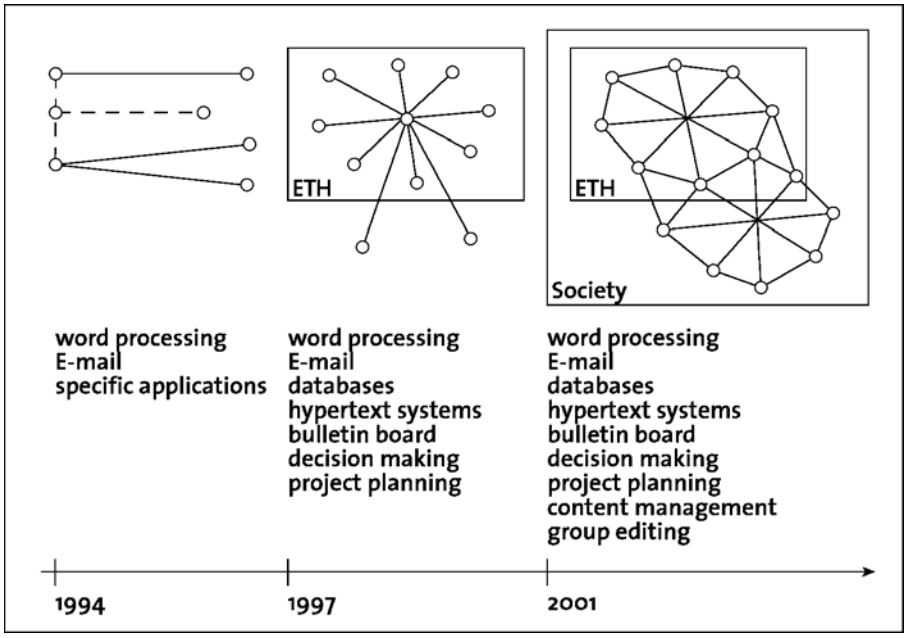

Figure 2: Three steps in using IT-tools within the ETH-UNS case study. From a limited peer-to-peer system to the «living document» as an integrative, decentralized and dynamic network.

It remains to be seen how the «living document» will assist local social networks and hence contribute to a sustainable regional development. For us, it has certainly the potential to contribute largely to actual project work, as it can support synthesis e.g. between different views from case agents and university researchers. It is, however, clear that it cannot replace actual human interactions and personal meetings. Yet, we expect that our project partner from the region gain more insights in our work and will therefore be more motivated and empowered to contribute actively to the successful outcome of our common project.

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