E-STUDY: THE DESIGN OF AN INTERNATIONAL ONLINE KNOWLEDGE COMMUNITY

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Abstract: The design of an online knowledge community is described. A online knowledge community serves as the socio-technical infrastructure for tele-learning. The E-Study Europe project is taken as an example of the design and development of an international online knowledge community in an university setting.

Introduction

Developments in technology, society and new pedagogies have changed the education last years (Tempelaars, Jager & de Vries, 1999). New technologies offer a wide variety of instructional, information and communication functionality. With the development of new technologies a whole new range of possibilities become available.

The educational concept we apply is the online knowledge community. In the E-Study Europe project a knowledge community is being developed to foster tele-learning activities in Eastern Europe. To enable tele-learning there is a need for a socio-technical infrastructure. A socio-technical infrastructure refers to a hardware and software infrastructure embedded into an organizational infrastructure. The main question of this paper is how a international online knowledge community can be designed.

Online knowledge communities

We see an online knowledge community as a group of like minded people who band together for frequent interaction by means of (an) online gathering place(s), where they share knowledge and

work together onto a specific knowledge domain through communication and knowledge services, because it is mutually beneficial. Online implies the (technical) infrastructure that is used to unite the group of people and to enable them to share their interests. The key elements of an online knowledge community are the members, the shared interests, and the instrumentality. The members can be described by role models. We distinct for instance: the organization, the expert, the master, the external and the apprentice role model. The shared interests can be described by the mission of a community.
Knowledge sharing and knowledge creation activities in a community require thoughtful and careful design. Two educational views are used for the design of a socio-technical infrastructure for a knowledge community:

- *constructivist view of learning*. This view implies that knowledge is not seen as an accumulated body of empirically verified facts, but rather is derived directly from observation and experimentation. In this view, it is assumed that knowledge is something that is constructed by people. Learning concerns the individual construction of knowledge as schemata, concepts, attributes, links, forms, etc.
- *cognitive apprenticeship approach*. In this approach, a master and apprentice work together on tasks in order to enable the apprentice to become a master. The purpose of Cognitive Apprenticeship is to transfer conceptual and problem-solving knowledge in an integrated and connected way (Collins, Brown & Newman, 1986).

Based on these educational viewpoints a technological design encompassing the technical configuration as well as more social requirements like the functionalities, services and resources available is needed. From this point of view, four design requirements for the technical system can be formulated:

Technical design requirements:
- The system has to be functional. The technical system should include all the functionalities users want from the information system and it should support the user while working with it.
- The system structure should be efficient. The design of the system should provide appropriate information to the user and should support the navigation through the system.

Social design requirements:
- The system has to be usable. Usability means the extent in which an user can work with the system easily and the amount of system support the user gets.
- Users should acknowledge that the system is valuable to work with, because of effective and efficient system use.

The technical and social requirements are presented in Table 1.

Design requirements for an online knowledge community

Technical requirements	Social requirements

Functional system	Useful system
Flexibility • Provide opportunities that members don't have to be physically present to participate in online knowledge communities. • Provide continuous communication so members could log on the community whenever it suited their schedules and where ever they are • Provide member functionalities to execute needed (learning) tasks and activities (based on function and task analysis)	Support • Provide a shared, understood goal to members of the community to learn about. • Embed learning / knowledge creation in social experience. Provide spaces and communication and collaboration opportunities that all could share. • Present opportunities for support: for modelling, coaching, scaffolding, fading, articulation, reflection, and exploration. • Provide both public and private feedback support.
Efficient structure Information-richness • Present needed information to perform tasks and store and maintain information in objects in a knowledge base. • Provides links to other useful (Web) resources and make selective use of outsiders for complementary insights and information. • Provide formal and informal environments. Let members of all kinds benefit from having a broader audience, see other's work and dialogue about ideas and insights. • Provide navigation tools that are easy to use.	User acceptance Interactivity • Establish clear lines of responsibility and functionalities for the different role members in the community. • Use contexts that reflect the way the knowledge and skills will be useful in real life to make the knowledge realistic and relevant and meet practical needs and development. • Support mediation between the members and provide mutual respect, tolerance and trust. The members must continually reinforce the collaborative premise of the community. • Foster a sense of collaborative learning and knowledge creation by including learning scenarios.

Table 1: Technical and social design requirements for an online knowledge community.

The requirements in Table 1 provide a framework for the design of an online knowledge community in the E-Study Europe project.

The E-Study project

The main goal of the E-Study Europe project is the development of a tele-educational infrastructure for life long learning purposes concerning the design of ICT-applications for organizational communication purposes as a mean for setting up a knowledge community. The project aims at the implementation of an European socio-technical infrastructure for enabling tele-learning in CCE that makes it possible for students from the CCE to set up and follow personalized curricula based on available certificated online courses.

The project comprises seven partners from four different countries (The Netherlands, Bulgaria, Poland and Germany). Every partner has a specific role or responsibility in this two-year project, for example being the project coordinator, scientific coordinator, course developer or design expert. In the first year of the project the knowledge community was designed and preparations were made for the technical infrastructure (computer network). At this moment courses to be used in the knowledge community are developed.

In the E-Study Europe project, the concept e-study is used (Vries, 1998). The e-study concept refers to a socio-technical infrastructure for life long learning. To enable life long learning there is a need for a socio-technical infrastructure, that is, a hardware and software infrastructure embedded into

an institutional infrastructure. To describe such an infrastructure, the concepts Interactive Study Environments, Interactive Study Systems and online Study Services are used. These concepts are illustrated in Figure 1.

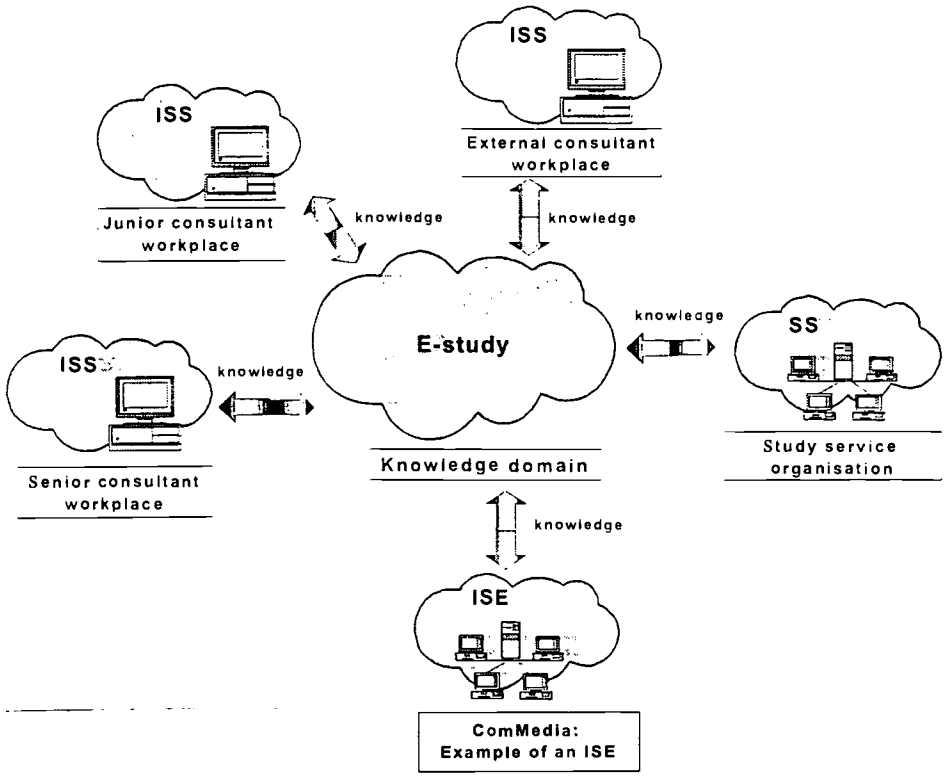

Figure 1: Example of a socio-technical infrastructure based on the E-study concept.

An Interactive Study System (ISS) can be seen as a software system consisting of study task views, study tools, information resources, and if needed additional materials. The main goal of an ISS is to enable an interactive study process between a user of the system and other users and/or between the user(s) and educational resources.

To give the needed support to teachers, there is a need for Interactive Study Environments (ISE's). An ISE is a software system for the preparation, application, and evaluation of ISS's. Such an environment consists of the following basic components: preparation, application, and evaluation tools and Interactive Study System Components. The main goal of an ISE is to improve the effectiveness, efficiency and attractiveness of the (re-) design, use and evaluation of ISS's.

In the E-Study concept teachers and learners will be supported by means of a wide range of communication and information services, summarised in the concept online Study Services. For instance, educational publishers as 'content owners' may act as a Study Service Provider. They provide teachers and learners, who apply study books of the involved Educational Publisher with services linked to the study books. In the e-study concept ISS's, ISE's and study services are interrelated.

In the E-study community the mission is 'the acquisition, creation, management, sharing, and incorporating of knowledge about the design of media applications for educational and communicational use'.

The infrastructure of a knowledge community refers to the ict-applications which form a meeting place for the members. This meeting place enables them to accomplish their mission. Application of modern ICT in education requires high performance backbones for data transmission. In Figure 2 the telecommunication model used in the E-Study Europe project is displayed.

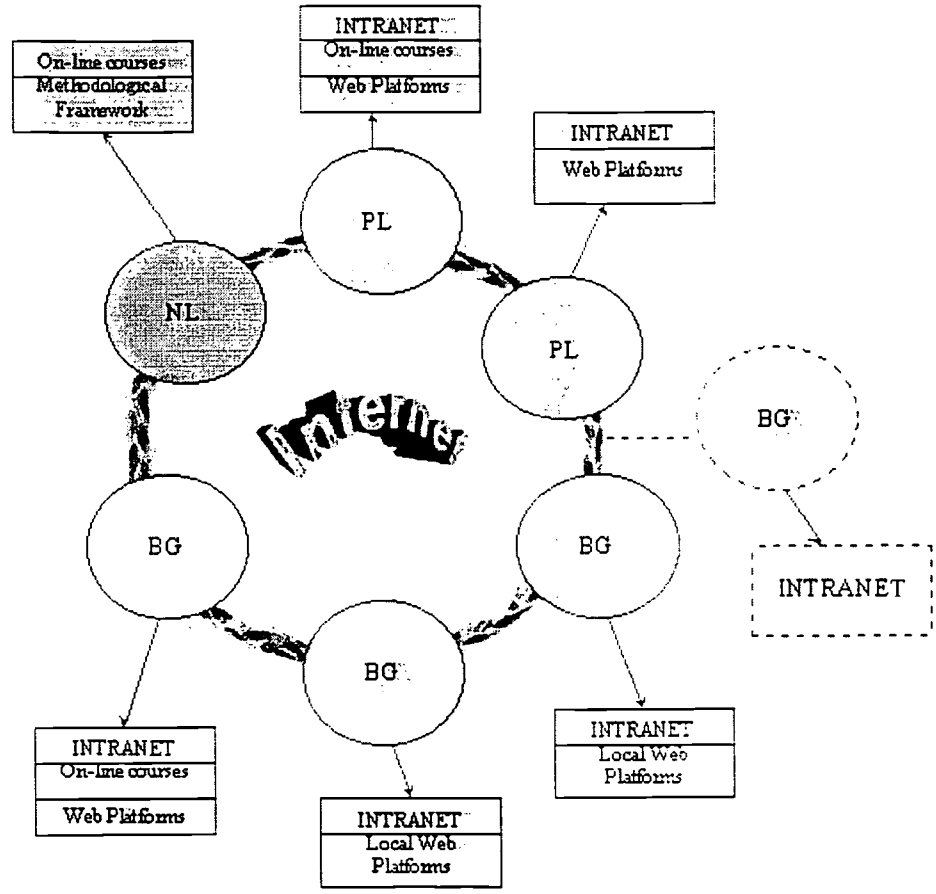

Figure 2: E-Study communication model

The presented telecommunication model enables a broad international propagation of the projects's result and make easier utilization and dissemination at European level. On the other hand, at local level the high-speed requiring technologies could be run on a local network.

Designing the E-study community

In the E-Study Project an Interactive Study System is seen as a study service platform for students and teachers. A study service or a closely related set of study services is made accessible by a workspace. A workspace is defined as a framework which consists of a set of views and interactions (with other users and/or the study environment) needed to make use of services. A view in this context is a set of knowledge objects dynamically created by a specific query on either the Knowledge Object database or the Person/Group database.

In E-Study we distinguish three basic types of workspaces: Personal Workspaces, Community Workspaces and Knowledge Workspaces. Personal Workspaces contain all views and interactions related to the personal housekeeping of the community member. Examples are the personal mail/agenda or portfolio. Communication Workspaces contain all views and interactions related to the co-operation and communication processes between the community member and the other members. Examples are group management, project management and/or communication tools. Knowledge Workspaces contain all views and interactions related to the creation and management of knowledge objects. We distinguish three types of knowledge objects: knowledge items, knowledge collections and knowledge sequences. Knowledge items are media products containing distinct messages. Examples are documents (like a MS Word file, a Quicktime movie or a Webpage) or links to external websites or ftp-sites (URLs). Knowledge collections are unstructured collections of knowledge items or other (sub) knowledge collections. An example is a collection of knowledge items about a certain topic.

Knowledge sequences are structured knowledge collections where a certain (non-)linear path exist between its components. An example is a course which is sequenced by a time schedule. By maintaining metadata, created knowledge objects can be reused and shared among members of the local knowledge community or members of other knowledge communities.

Based on these basic workspaces, customized workspaces can be constructed for certain types of interactions and views. In E-Study we distinguish a Guest Workspace (based on the Personal Workspace) and several workspaces based on the Knowledge Workspace: Tutorial, Support, Design, Archive and Explorative workspaces. In some cases, combinations of these workspaces are possible.

Workspaces contain a set of views and interactions. We distinguish the following views (and related interactions) in E-study: 'What's new?' View, Identity View, Agenda View, Portfolio / Showcase View, Records View, Personal Education Plan View, Notations View, Groups View, Knowledge Object View, Overview of relevant tools, Communication tools, Collaboration tools.

By using workspaces as a framework to organize views, interactions and tools, study environments gain a more dynamic and adaptive way to accommodate several types of learning in the knowledge community.

Further developments

The development of the knowledge community is still under way. The next step in the E-Study project will be the development of courses to be used within the developed knowledge community. The courses planned to be set up have to contribute to a trans-national on line curriculum on "Design and use of Interactive Media for Corporate Communication". Two trials are going to be carried out to identify the viability of the concept used in the E-Study project, the effectiveness/efficiency of applied tools, services and approaches.

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