Distributed Computer Supported Collaborative Learning through Shared Practice and Social Participation

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Abstract: As an educational approach, Computer Supported Collaborative Learning is often interpreted as a restricted concept concerning shared knowledge acquisition rather than, more broadly, as a holistic process of shared formation and socialization. Several aspects of learning and cases of research, however, indicate that we need to consider the idea of educational processes as processes of socialization, e.g. Jean Lave and Etienne Wenger (1991) who work from a concept of learning as social participation.

In physical institutions there are different socialization structures at work which support the learning process: the buildings, the course plan, the schedule, the pedagogical principles, the physical gatherings, the evaluation system, etc., all of which are elements in the socialization process. Normally, these socialization structures work "tacitly" and, as such, they are not reflected. However, when establishing *virtual* educational programs, we need to make explicit the socialization structures which may support the learning processes and the shared knowledge construction.

This paper presents an educational design of Distributed CSCL. From central key concepts in the social, analytical framework of Situated Learning (Lave & Wenger 1991), the paper discusses how - and to what extent the request of supporting socialization structures in the virtual distributed learning process are dealt with.

Keywords: Project based learning, Situated learning, Computer-mediated communication

Introduction

In the seventies, the critical educational discussions dealt with critique of the socializing structures in the educational systems. Several analyses (Bauer and Borg, 1976) inspired by a Marxist perspective were showing how the educational systems, through structures as schedules, disciplines, the bell, the concept of classroom were socializing the pupils and students to accept and adjust to the ruling ideology of the mass-industrialized society. This was called “the hidden curriculum” because the socialization structures were carried out “behind the back” of the participants in the learning process. However, the structures were at least as active for the social practice as for the formal curriculum.
Today, the educational discussion has left the critical analytical approach and has taken a more constructive and pragmatic perspective focusing on educational design, especially focusing on how to enhance collaborative learning through information and communication technology (ICT). This is also the objective of this paper. However, in order to do so, we need to unthink and rethink the socialization structure, which constitutes institutional learning and then transform it to design.
In the work of Jean Lave and Etienne Wenger (1991), who consider learning as social participation, we may find some help in that process. With the point of departure in an ideal typical learning situation, namely apprenticeship learning, they formulate some basic principles of learning as social practice, which may guide the design.
In section two, we will look at some of the central key concepts from the framework of Situated Learning (ibid.): the reestablishment of time and place, the access to and transparency of the learning community, and finally processes of involvement and reflection. After describing the virtual, educational environment in use, we will discuss how - and to which extent - the request for supporting socialization structures in the virtual distributed learning process is dealt with.

Learning as socialization

The point of departure for Lave and Wenger’s work (ibid.) is the study of central characteristics of several historical realizations of apprenticeship in terms of legitimate peripheral participation. The main idea is that the learner gradually moves from the legitimate peripheral participation towards full participation in the community of practice and that participation in the community is the real curriculum.

There have been several critical discussions of Lave and Wenger's work (Aboulafia & Nielsen, 1997) regarding the concepts logic of extension. We are not going to present these, however in this case, we see Lave and Wenger's work (ibid.) as a contribution to a socialization theory, which focus on important (and forgotten) aspects of social learning.

There are several aspects influencing the realization of the principle of legitimate peripheral participation:

- In a social learning process in a virtual community, where time and place in principle are stretched, one of the most important structures to deal with is the re-establishing of a shared context. Without re-establishing a social and shared context, it is not possible for the participants to communicate or collaborate.
- Another aspect is the access to and transparency of the community. The key to legitimate peripherality is access by newcomers to the community of practice and all that this membership entails. To become a full member of a community of practice requires access to a wide range of ongoing activities, old-timers, other members of the community, information, resources, opportunities for participation and the artifacts (ibid. pp. 100-101). As Lave and Wenger say: "The practice of the community creates the potential "curriculum" (ibid. p. 93), and "that engaging in practice, rather than being its object, may well be a condition for effective learning" (ibid. p. 93)
- The last structural dimension to deal with in this paper is that of language or discourse. Normally, in educational contexts, we focus on language as a tool for knowledge transmission and knowledge construction. However, to move towards full participation is to acquire the discourse of the community and to be able "to talk about" and "to talk within" the practice.

Before we go on discussing these structural dimensions, we will present the educational context.

Presentation of the education: ICT and learning, a one-year program within Humanistic Informatics

General

"ICT and learning" is a one-year university program for educators and people from organizations dealing with educational tasks and human resources. The education is delivered on a halftime basis as distributed CSCL over the Web, with four physical weekend seminars at the university and an exam seminar distributed over the year. Aalborg University, Department of Communication, runs the education.

Content

The *goals* are to be able - in reflected and appropriate ways - to integrate ICT in teaching and learning and in processes of organizational development. We stress that the learning environment is a sort of experiential laboratory where we are doing experiments with and reflecting on the use of ICT. The education itself has therefore been an example of what we are trying to teach. The education had three courses embedded in one project work unit. The three courses are:

K1 (theoretical): *Media, technology and culture*. The course went through different ICT-concepts and central theories about the technology-based information society. The students derived general knowledge with respect to analyzing ICT from humanistic, cultural, and historical perspectives.

K2 (theoretical*): ICT, collaboration and learning*. The content of this course was the whole research area of CSCL related to the general field of learning theory. As such, the course emphasized the relationship between technology and cognition, and the focus was on the central concepts of learning, communication, and interaction in relation to the use of ICT in learning.

K3 (theoretical and practical): *ICT in teaching and learning*. This course gave an introduction to a variety of teaching and learning software. In particular, the Internet was in focus as a tool and medium in teaching and learning. Departing from different contexts, the course worked with examples of teaching and learning software from an analytical, an evaluative, and an applied perspective.

The project work: The group-based project work is based on the specific pedagogical approach of "Problem-Oriented Project Pedagogy" (POPP) (see below). The group works during the year in depth with a self-defined problem related to ICT and learning. We stimulate the students to work with real-world problems from their own practice. The work gets manifested through a written research report.

Pedagogical approach

The general pedagogical approach of the entire education is "Problem-oriented Project Pedagogy" (POPP) (Dirckinck-Holmfeld, 1990). The approach has its roots and ideology in the "critical emancipatory thinking" established in the 70'ties. POPP is in fact applied across faculties as the general pedagogical

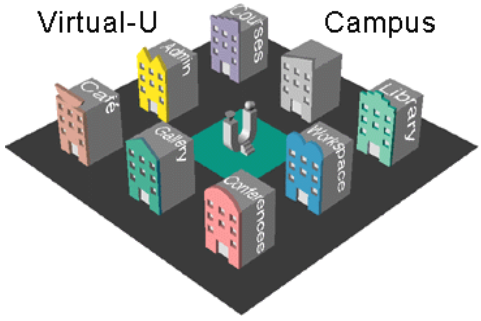
approach in all teaching and learning activities at the entire Aalborg University. Within this pedagogical model the majority of the activities take place as group activity (the exam as well) and resembles - to a certain extent - what in North-American countries is called "problem solving" or "project-based learning". POPP resembles these approaches in the sense that the students work on projects and try to address the problem in a scientific manner rooted in practice. There is one essential point, however, where POPP differs from problem-based learning: The project group "owns" the problem so to speak, as it is the group itself in interaction with the teachers which define, construct and formulate the problem. A very important element in this approach to learning is the relation to practice.

The virtual environment

The education was implemented on the Web, using the virtual environment "Virtual-U" (1). Virtual-U is a virtual environment for learning based on the concept of "collaborative learning". It is developed (and is still being developed) under the direction of Linda Harasim and Tom Calvert by the Telelearning National Centre of Excellence in Vancouver, Canada. Virtual-U is intentionally designed to facilitate "asynchronous discussions, collaborative learning and knowledge building" (Fisher et al., 1997) in distributed collaborative learning processes.
The Virtual-U system is built from the overall metaphor of a university campus and consists of a variety of integrated components: a space for communication, individual work space, a space for accessing courses (with incorporated course activities), a gradebook and other tools supporting these facilities. The design metaphor of a university campus is carried through only at the first two levels. The conferencing facility is communicated as lists and the activities as choices in menus, sometimes graphically based.
Within several fields of research, it is generally acknowledged that the use of metaphors plays a strong role in human acts and thinking (Lakoff & Johnson, 1980; Sorensen, 1991).
What is worth-while noticing in relation to the use of a spatial, physical metaphor is that human concepts for spatial orientation seem to be primary to us in terms of structuring of space. This has a consequence for the power in terms of supporting the user's intuition in the navigation with the interface:

> The communicative power of spatial metaphors are interesting for the purpose of finding principles of design of virtual environments that operate on a basis of intuition. Spatial or orientational metaphors arise from the fact that we have physical bodies that function the way they do in our physical environment, and that the structure of our spatial concepts are created from our fundamental spatial experience. (Sorensen, 1997, p. 109)

Seen from the perspective of socialization, the campus metaphor may help the students and teachers intuitively to relate to the university practice as well as it may help their navigation. When they enter the virtual-U (2) campus they intuitively feel that they enter the university and as such they get some “tacit” help for what they are doing, what is the focus of the practice and so on.



Virtual-U supports a multimedial concept of learning material as it handles all different types of data: text, sound, graphics, animation, video, and – as such – also links to other resources. Virtual-U allows these various types of multimedial materials to be implemented by all participants avoiding any hierarchical structure. However, it is necessary for the material to be implemented that it is uploaded to the Virtual-U server beforehand.
Virtual-U constitutes a strong tool for online course design. The system supports design, delivery, and enhancement of courses on the World Wide Web and is designed with the special ambition to facilitate and support collaborative learning processes. From the course building, it is possible to enter the course

template from two perspectives: 1) a learner perspective (course viewer), and 2) a learning design perspective (the designer, the instructor, etc.)

A recreation of shared situated context (time and space)

The course design tool is a strong feature of Virtual-U, and it constitutes a powerful and flexible tool for the course designer or the instructor:

> Course design support includes guidelines for setting learning outcomes, instructional techniques, evaluating learning outcomes, "netiquette", discussion or project group design, learning activity design, and course syllabus creation. Ancillary discussion groups can be set up within virtual-U to allow groups of teachers and/or support staff to discuss instructional strategies, support issues, etc. (Fisher et al., 1997, pp. 1)

First and foremost this potential provides support to the course designer but, from the learners' perspective, it also supports the shared communication and collaboration as it provides a possibility for what we would call a “re-creation of shared situated context" for the communicating and collaborating parties. In situated collaborative learning actions as well as in other types of situated human actions, a concept and feeling of situatedness and shared context is important (Lave & Wenger, 1991; Suchman, 1987). In real life, the most general and important parameters in the creation of a situated contextual aspect are the parameters of TIME and SPACE (Sorensen, 1998). It is from the implementation of our actions in the instant that we understand ourselves, our relations with others and with the world (Ricoeur, 1978). What the course template of Virtual-U does is exactly to provide us with a re-constructed context through knitting together TIME, THEME, COMMUNICATION, RESOURCES and ACTIVITIES, and in this way providing us with the possibility of designing “shared situated learning actions" that work for collective and collaborative knowledge building.

Access to the virtual community

Compared to the face to face university practice, the virtual environment has some strong features regarding access to the community. As every action is a written language action and as so kept in the database, all the students and teachers have, in principle, access to the community throughout the entire learning process. Very easily, the students and teachers are able to browse through the course work and project work and get information about the others. Information on how they work, what they discuss, what theories and problems they are dealing with, their individual work style and contribution to the shared work, etc. which makes it easy to follow and to really relate to each other. In the face-to-face project work, the students work in separate physical rooms, which somehow makes it difficult to exchange information among the students. Therefore, in the case of the virtual community, the students have more easy access in some respect to the practice of the community.
Regarding the specific knowledge construction process, this shared information database, may also help the individual as well as the group in several ways: There is a form of “semiotic mediation” (Vygotsky, 1978) where the written discussions help the students in the process from outer to inner speech. The easy access to the knowledge of others may also help in a reciprocal tutoring process (compare the concept of “Zone for proximal development (ibid.))
However, there are also barriers which traces back to the distributed and virtual nature of the learning environment. There are no informal meetings in the hallway (3). There are only limited access to the imitation of others, while you only see the conscious, written actions of the other Added to that comes that some articulation processes: problem formulation, decision taking, critical discussions, etc. (Fjuk and Dirckinck-Holmfeld, 1999) require extra work of the participants.
All together this means, that the virtual community offers new potential in terms of access to the practice of the community. But it also means that the virtual community lacks some of the features from the physical community, that have to be reflected in the educational design, through e.g. building in physical seminars or a comprehensive use of multimedia and synchronous communication.

Social practice, dialogue and reflection

When something becomes visible to us or acknowledged by us, it happens because in some way or other we see it at a distance and are able to reflect (or meta-communicate) on the matter. "Creating distance" (i.e. supporting situations of reflection) is exactly what happens when we move our learning designs from the involved universe of the physical communities to the reflected universe of the asynchronous virtual communities. Moving to the virtual world simply adds a reflective level to the actions and interactions of collaborative learning (Sorensen, 1999). Lave and Wenger describes this as "talking about" a practice.

Correspondingly, concepts fit to describing involved actions in our physical world must change too in order to be useful in a symbolic world of representation in which a large part of the involved actions are converted to manipulation of representations and manipulation of communicative acts. The move of collaborative learning to a representational virtual environment also means a move from interacting through "involved situated speech" to interacting through "reflected writing". The latter may, however, depending on the individual personality and the frequency of the exchange of comments in the actual situation, be practiced in a dynamic, involved mode. This corresponds to what Lave and Wenger calls "talking within a practice":

> Talking within itself includes both talking within (e.g., exchanging information necessary to the progress of ongoing activities) and talking about (e.g., stories, community lore). Inside the shared practice, both forms of talk fulfil specific functions: engaging, focusing, and shifting attention, bringing about coordination, etc., on the one hand; and supporting communal forms of memory and reflection, as well as signaling membership, on the other. (Lave & Wenger, 1991, p. 109)

The reflective invitation of the communication and interactions unfolding in virtual environments is further emphasized through the mono-semiotically based, but relatively decontextualized written language (Sorensen, 1993; Dirckinck-Holmfeld & Lorentsen, 1990).
But learning as social practice implies another mechanism than reflection, namely an equally important element of practice, i.e. the non-verbal, carrying-out-part of things. These two - the non-verbal practice and meta-communication (i.e. reflection) around practice - are dynamically and complementary connected in that the ability to, verbally and socially, meta-communicate about a shared non-verbal practice implies a process of reflection. In fact, this is what Lave and Wenger point to, when they talk about learning as a process of gradually acquiring the discourse of the community (i.e. the meta-communicative ability through reflection) while moving towards full participation in communities of practice.
Viewed in this perspective, the reflective level given through the virtuality and the representational character of actions in virtual communities of learning may be seen as a new and hitherto - in physical communities - unknown support for learning (Sorensen 1999) viewed as socialization.

Conclusion

Creating learning environments require that we not only look at Computer Supported Collaborative Learning as a restricted concept concerning shared knowledge acquisition. Rather, we have to view collaborative learning as a holistic process taking place in a context - a community of practice. In doing so, our focus moves from the single knowledge acquisition process towards an understanding of the dialectic structures that support the community of practice. We regard these structures as socialization structures. Socialization structures can be seen as the “hidden curriculum”, however, in order to gain more radical understanding of learning and the support of learning, the socialization structures may also be viewed as *a part of* the curriculum – and the socialization structures may be dealt with in a conscious manner.
The broader focus on the socialization structures is especially important when we are designing web-based education. In order to support the single knowledge acquisition process and collaborative learning, we have to focus on the socialization structures that make it easier to learn, so to speak. If we look only at the learning processes, we find that several of the more traditional learning activities have *extra* work as a prerequisite (Fjuk & Dirckinck-Holmfeld, 1999) to be carried out with success in the virtual environment. So in order to avoid it or to support the intentional learning process, we have to build up an understanding of the socialization structures which indirectly and directly supports the participation in practice.
Very often, web-based education is seen as secondary to the "real" face-to-face based education. Our discussions indicate that this way of setting the problem is wrong. It is not one or the other. The two modes of learning hold different qualities. So the challenge must be to find out which “naturally” given socialization structures we are missing in a virtual context and to be sure to build these into the design of the interface as well as the pedagogical approach.
In this paper, we have pointed at the following structures as being essential: re-establishment of context, transparency and easy access to the community, and processes of involvement and reflection. We have initiated the discussion of these issues on the basis of a specific educational design. However, much more work has to be done along these lines before we really understand and hopefully are able to use the findings pro-actively in the design of virtual learning communities.

Notes

1. The educational program can be found on the following address, http://vuhuminf.hum.auc.dk:8007. However, you need a password to enter the learning environment.
2. A very relevant question is whether the design of the Virtual-U Campus is a good design for a course in a Danish context. Critical comments are the English language and the concepts, however also the functionalistic architectural design may create some distance. However, in principle, we find that the campus metaphor really helps the students' and teachers' shared building of identity.
3. This function is in fact built into another conference system First Class, where you can see who is on the system, and where you can invite for a chat. (This function is also under development in Virtual U.)

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