Approaching pedagogical networking through teacher education

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Abstract: The concept of networking has become one of the key issues in the discussion about the development of schools in Finland. In this article we are outlining the characteristics of pedagogical networking in virtual school environments. Pedagogical networking means above all teachers exploiting decentralised knowledge, creating open, distance and co-operative learning environments and being an active partner in network-based teamwork. Teachers also need network knowledge about maintenance of interaction using various media in a pedagogically meaningful way. These questions are further researched in the LIVE (Learning in a Virtual School Environment) project It aims to develop pedagogical networking models for pre- and in-service teacher education.

1. OUTLINING THE CHARACTERISTICS OF PEDAGOGICAL NETWORKING

During the last few years the concept of networking has become one of the key issues in the discussion about the development of schools, especially where new media are involved. One of the main reasons for this was the reform of the Finnish national curriculum at the beginning of this decade (POPS 1994) which gave schools more freedom to organise their work. It also enabled the growth of various experiments in open and distance learning environments with the aid of the modern information and communication technologies (ICT).

The role of networking can also be seen as a significant natural continuation of open and distance learning (ODL), which was originally

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based on the idea of a single learner's opportunity to study independent of time and space. The concepts of co-operative learning and virtual learning communities have also been included in ODL through networking.

A wide variety of categories are created by analysing different classifications of networking, depending on the point of view from which networking is being examined. While Helakorpi and Suonperä (1995) classify the networking levels of a school by the property of distance, Tella's (1997) viewpoint is socio-cultural rather than spatial. Since this paper is part of the LIVE project research, we wanted to create a classification of our own to examine networking of schools from a pedagogical point of view, especially through teacher education.

The lowest level of networking is physical networking. This includes the technical infrastructure needed for telematic communication based on telephone lines and computers with Internet connections. A more sophisticated environment may include a complex LAN/WAN network with video conferencing and groupware facilities. More important than the technological progressiveness of this network are the development, maintenance, usability and uniformity of this system throughout the network. No higher level of networking is possible if the infrastructure behind it is unstable or out of use. In Finland we have a very high level of technological infrastructure. The objective of the Ministry of Education to physically network all schools by the year 2000 will be achieved (Ministry of Education 1995). The physical is more concerned with the maintenance of these systems.

We call the second level of networking social networking. It is based on the fact of people knowing each other, having interrelationships and interests in working together. The information society offers people new, complementary communication tools to maintain these relations. Information networks create new types of social structures, virtual communities and means of social participation (Tapper 1998). Social networks promote interaction in telematic networks. The network is a resource to be exploited in the field of education as well. Tella (1997) for example discusses the networking of telematic virtual school environments,.

The third level of networking is an active learning environment, not just a resource. When the interaction in the social network has produced motivation for people to co-operate, we can speak about pedagogical networking. It means above all teachers exploiting decentralised knowledge, creating open, distance and co-operative learning environments and being an active partner in them. Pedagogical networking is an intentional and object-oriented activity by means of media education in an modern ICT-rich environment. Evaluation of different activities, especially learning, is characteristic of pedagogical networking and in that sense it also differs

from social networking. One of the challenges of teacher education is to train network educators, virtual teachers who have the skills and abilities in pedagogical networking.

2. NETWORK KNOWLEDGE AND SKILLS

In addition to understanding the structure of pedagogical networking, it is important to consider the teacher's skills and knowledge in relation to the development of the information society. The teacher's network knowledge, which should be developed during pre- or in-service teacher training, forms the foundation of pedagogical networking. Network knowledge can be defined as the teacher's ability to plan and carry out an educational project in open and distance learning environments. To accomplish such a complex task, the teacher also needs to know the curricular content of various educational institutions as well as the characteristics of the various media and how these characteristics effect a learning situation.

The teacher's own interaction skills and flexibility in the planning phase are also important. To maintain and develop the physical network, teachers also need to be familiar with the terminology used by the computer and communication industry. They have to be able to decide which technological choices are suitable for their school. From the viewpoint of administration, networking also requires understanding of the mechanisms of the network economy. Teachers mastering network knowledge can be seen as entities of decentralised expertise, but rather than being individuals, they should be able to combine other expert knowledge (teachers, students, specialists) for the good of their pedagogical network.

To summarise the various aspects of a teacher's network knowledge and skills, it can be said that the most demanding task for a teacher in a pedagogical network is the maintenance of interaction, which should be done at all levels of the network, using various media channels in a pedagogically meaningful way. Through the management (hallinta) of network knowledge and skills teachers can achieve multidimensional mastery of network competence. The challenge in teacher education is to develop tuition and tutoring skills in a complex, multi-mediated pedagogical network, opening future and in-service teachers virtual wormholes to the global networking level.

3. NETWORKING TEACHER EDUCATION – THREE CASES

3.1 Teacher training practice

In this section we describe the phenomena of networking through three cases. Our first example of networked teacher education comes from teacher training practise, where open and distance learning methods have been used by the students as well as in the tutoring process between the student and the lecturer (teacher trainer). In this particular example student teachers were physically separated: one was at the Second University Training School in Helsinki and the other one at Kilpisjärvi about 1300km away. During the interactive phase of teaching the pupils in both schools networked into co-operative groups using LIVE working. Before the teaching session there was a meeting in which the teleteam of teachers (student teachers, local tutoring teachers and a teacher trainer) planned the upcoming work and evaluated the plans using video- and audio-conferencing (Ristola and Rönkä 1998). Helakorpi and Suonperä (1995) refer to an amoeba-like team of teachers which functions flexibly according to pedagogical needs.

In the planning phase the element of openness, creating choice for the pupils, was emphasised. At the same time this session was part of teacher training practice, in other words a simulation of a real classroom situation. A key issue, in educating teachers who have a good command of telematic communication, is giving student teachers real experiences in implementing networking and open and distance learning during part of their studies. In their portfolios students have also raised the question of time as a key factor of networking. The network established during the teacher training period is a short-term, almost a momentary phenomenon, but in the background there is a permanent basic network of teacher training which is constantly maintained.

3.2 In-service course in media education

The second example of networking in teacher education comes from the area of in-service teacher education. Since autumn 1996, the Media Education Centre has been organising a 5 credit (7 ECTS) course in media education. The course is financed by the National Board of Education and is free for all teachers working in primary, secondary and tertiary schools as well as in folk high schools or workers' institutes. The main objective of the National Board of Education has been to give the teachers attending the skills and knowledge to work as pedagogical modern ICT-experts in their own schools. In the courses organised by the Media Education Centre, this

aim has been achieved by initiating teachers into the working methods of team- and network-based learning and open learning environments and by giving them facilities for telematic communication through co-operative working.

The main core of the course is a 2 credit (3 ECTS) pedagogical project, which is focused on the development of the pedagogical use of MICT in the teacher's own working environment. For this project the participants are divided into tutor groups of around 15 people. In the first tutor group meeting the group is further divided into 4/5 person teleteams based on their own areas of interest and the subject of their project. The aim is that in every teleteam there is a pair of teachers from two different schools. This enables creation of a team where teachers will be networked inside their own school as well as between schools.

As mentioned before, every teleteam plans and carries out a pedagogical application related to its own area of specialisation. The subject of this application can be, for example, an analysis of the learning material available in the information networks, production of WWW learning materials, a learning module based on video-conferencing technology, or a research-related analysis of distance education. A teleteam is also responsible for deciding the common objectives, working and evaluation methods and criteria for their project. Every teleteam will get feedback from their tutor as well as from other colleagues in the tutor group via email, a web-based discussion forum and during the face-to-face meetings taking place 4-5 times during the four-month course.

The analysis of the feedback gathered from the participants shows that networking of teachers has been an essential part of their learning experience. Having an opportunity to share one's own experiences, problems, frustrations, successes with colleagues of the same background has been seen as important. Tutor group meetings have also been important events for getting feedback on one's own decisions and gaining new ideas when listening and commenting on other people's work. Evaluation of the projects clearly shows that teleteams, which have had clear and common aims and functional communication channels for their project, have been the most successful. The pressure to keep up with the schedule is also stronger, working in a co-operative team where every member has their own task to accomplish. One of the biggest problems of the teleteams has been of a technical nature. Members have not had functional email connections or easy access to web-based discussion, so that the co-operation has been limited. Problems also arise when a teacher comes to the course without a clear picture of their own aims or areas of interest in mind. They might become part of a team whose project does not have a clear connection with their everyday work.

3.3 The LIVE Project

The LIVE project is a three-year research and development project, intended to develop teaching and learning practices in an information-rich and knowledge-intensive virtual school environment with a particular emphasis on mobile communication. This is carried out by increasing the potential for co-operative and experiential learning in teacher education and by using modern information and communication technologies in open and flexible learning environments effectively.

The example of networking in the LIVE project is a development group, which started its work during the first year of the LIVE project. The members of this are all teachers/lecturers in the University training school (an upper and lower secondary school) tutored by the researchers of the LIVE project. The main objective of the work of this development team has been to promote teachers' pedagogical thinking in open and flexible learning environments. Another aim has been to support training school teachers pedagogically and technically when they start using the modern information and communication technologies (ICT) in their work. Teachers taking part in the work of the development group have familiarised themselves with the various phases of LIVE working (Nummi et al. 1998) such as didactic media planning (Sariola 1997, 1998). During the school year 1997-1998 teachers carried out some pilot projects using integrated mobile communicators in their own classes. These projects have been reported to the research group of the LIVE project. The development group has become a part of the research arrangements as well as the objects of the research through these experiments.

From the educational point of view a group of teachers working within one school towards the same set of goals forms the smallest networking unit. Members of the development group establish this kind of network when they plan LIVE working. In the practical implementation of LIVE working the co-operative planning of at least two teachers is needed. The idea of co-operation as a part of networking arises from the theoretical background of the LIVE project (Nummi et al. 1998). In the development group, teachers work co-operatively in a technology-rich environment where planning together is a key issue. Teachers have been able to introduce and develop new ideas together, get support and encouragement from their colleagues and discuss on the values of the use of modern ICT.

A development group is an organic part of the everyday life of a school and its developmental activities. Teachers can establish internal networks (local networking) in schools whenever needed. Through these development teams, the value of the most natural basis of ICT-based networking, the colleague next door, is promoted. At the same time, interaction in the

networks also promotes new thinking and new innovative activity (Andersson 1994). By means of LIVE working, local networking can be extended to the surroundings of the school. Authentic information is gathered using portable telecommunication equipment, where it is most naturally available – market places, shopping centres, museums, enterprises, universities. The role of experiential learning as a mean of more effective learning is enhanced through networking.

In their self-evaluations the members of the development teams wrote that there had been efforts towards networking and co-operation in their team. Professional development can also be seen through the development of ideas and innovations within the development teams. Working in the group is seen as in-service education, which supports the theory that in networked organisations in-service education increasingly takes place in working places (Helakorpi and Suonperä 1995).

4. CONCLUSIONS

In many cases physical networks have been used to distribute pedagogical information such as learning and teaching materials, or evaluation data according to the principles of decentralised expertise. The essential features of pedagogical networking, as we see it, are on the one hand the characteristics of high quality learning (De Corte 1995; Jonassen 1995) and on the other hand the clear pedagogical aims of the activities in the network.

Our three cases of the development of teacher education towards open and distance learning clearly indicate that the first, physical level of networking is reached when teachers have access to use technology within a relevant information network and also have the basic ICT skills. In fact, fulfilling those requirements is essential for open and distance learning. Further, the level of social networking requires interaction skills as well as the ability to use the physical network for social interaction. In addition, motivation, i.e. willingness to co-operate, and clearly stated learning aims are needed to reach the level of pedagogical networking. Pedagogical networking can give added value to learning if it helps to create authentic, real-life situations where each learner as a participant has an active role. It is also important to understand how pedagogical networking changes the teacher's pedagogical work. Through co-operative planning and evaluation, the teacher changes from a traditional individual athlete into a team player, from a referee into a quarter back.

Based on our observations, it seems that pedagogical networking is not an easy way for a teacher; it requires much commitment and patience in the searching and testing of the characteristic working models of the network.

The design of learning environments based on the use of modern ICT is often solely focused on open and distance learning and the development of networking skills. This is understandable because various applications of virtual school are often the new aspect of learning enabled by ICT. It becomes problematic if the interaction between the physical learning environment and the virtual classroom is forgotten in the design of learning situations. In the open and distance learning of adults the meaning of the physical environment is not as important as in the classroom-focused distance learning where uniting the virtual classroom and the physical classroom into a common learning space is essential for pedagogical networking.

Another challenge in pedagogical networking is the development of assessment methods. The way of assessment should support the learners' own studying and learning processes and strengthen the cohesion of the learner groups. For these purposes, the latest effort within the LIVE project has been the launching of the development of virtual portfolio in teacher training. It is our belief that, by changing assessment practices, the school culture of teachers and learners can be changed towards the creation of an open, pedagogically networked school.

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