TELE-EDUCATION FOR NETWORK-CENTRIC ORGANISATIONS: AN ADULT EDUCATION VIEW

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1.   Introduction

The discussion group had a covering international representation both from developed and developing countries and from different levels of education ans service roles (See Table 1.)

Table 1. Discussion group participants

Mikko Ruohonen	(MR)	University of Tampere, Tampere, Finland
Simon Kerridge	(SK)	University of Sunderland, Sunderland, U.K.
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Much of the discussion concerning tele-education is focused on technological issues. However, technological imperative is not enough when examining the potential of tele-education for network-centric organizations. Real networks are more than just cables and servers, they are also social networks and people-to-people connections. Educational contents can vary widely, from very structured, hard knowledge to a more fuzzy types in which end-results are different. In addition to that educational processes involve a number of stakeholders, it is not any more teacher-student interaction, it is growingly a teamwork of core learning contents providers and supporting organizations and people. Furthermore, this happens in an environment in which you need to work with multiple cultures, within a varying number of learning theories and redesigned educational processes (see more Ruohonen 1998). For example, Leidner and Jarvenpaa (1993) suggest that course contents, available technology and instructor factors influence the type of teaching method used. Student factors (experience, attitude, personality and learning style) and instructor factors mediate the impact of the teaching method on class interaction and in-class learning i.e. the type of material covered during class (factual, procedural, conceptual, or exploratory). In class-learning and class interaction affect learning and class performance. In this report the research model is extended to include also socio-cultural learning environment. Mediation is the keyword in this model. The tools (i.e. interactive technology) mediate learners (i.e. the active subjects), and object (mastering the knowledge). It has been noted that personality of a teacher affects the teaching practice. More research is needed in observing teacher practice in open, electronic learning environments. However, two other critical mediation forces are also present. The prevailing rules and approaches used before for teaching which can either promote or inhibit the modern IT-induced learning process. This is related to teacher training and introduction of service-oriented support personnel. Also the division of duties between, say network operators, software agents, information providers, teachers and learners affect and

question the stability of the learning system. Open learning environments should be flexible to use available resources regardless of time or location.

2.   The Big Picture

2.1   Research model

The following "triangle" (see Figure 1 below) describes the problem area in one dynamic picture. The relationships between different corners   are important in interpreting contradictions of tele-education for network-centric organizations. In short the six main "corners" of the triangle are:

- Information Technology (the platform on which tele-education is based)

- Stakeholders (e.g. Teachers, Students and other involved parties)

- Subject Contents Area (the nature and how it is mastered)

- Pedagogical assumptions (what is the teaching model / theory behind tele-education)

- Social Learning Community (what is the interaction between students and other stakeholders)

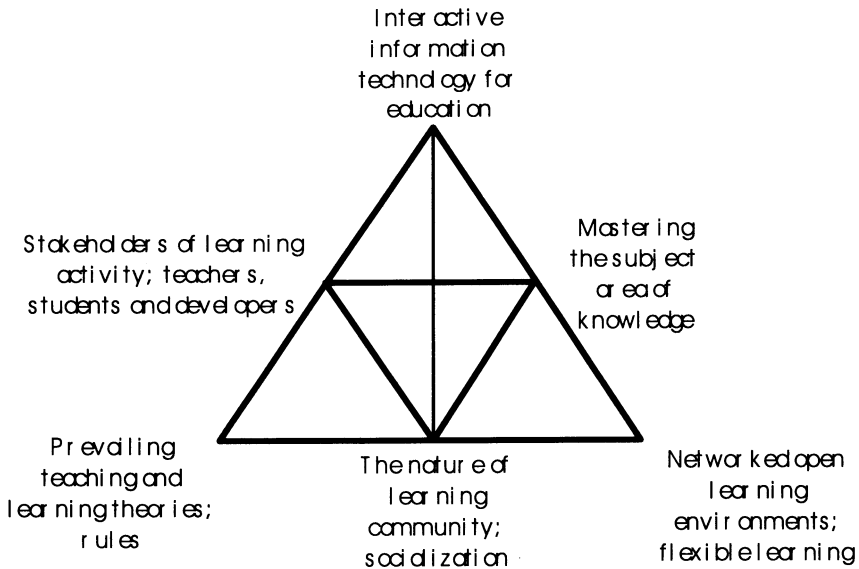- Process environment (the general learning environment and division of processes)

Figure 1. Research model for a deeper analysis of tele-education in the context of network-centric organizations (Ruohonen 1998).

2.2　General issues from the big picture

After first reflections based on the model the most urgent issues emerged to be, first, relationships between students, teachers, supervisors and other related groups, secondly, technology should be used just as a technical platform to transfer knowledge, not as an end itself and, thirdly, growingly learning communities are growing diverse and difficult to manage.

2.3　Specific issues to be investigated

The most interesting and least researched aspects of the six axes were: social learning community, satellite communication systems for education, motivating students to use the systems, co-ordination of stakeholders in the system, social community, human interactions in network environments, processes in network environments, the role of the learner, tailored learning, how to organise learning environments, using all possible learning materials and media, training teachers in the new pedagogies, stakeholders and learning activities, material development from multiple sources, ensuring the relevance of materials for technologies, real-time processes, business games for learning and networks for distributed training. Although this list is not comprehensive it gives a good indication of the bounds of the areas for future research and development.

In summary the following topics were seen as the most promising for future research:

- networked process environment
- collaboration between users and teachers
- community aspects (e.g. cultural, geographical, subject, etc),
- usable technology

Networked process environment
In general the flow of such learning/teaching systems can be seen in the following three headings, which cover the lifecycle of the whole theme:

- Planning
- Process (can include evaluation if done during the course)
- Evaluation (equivalent of final exam, but also evaluation of the teaching)

A discussion was raised about the actual definitions (i.e. contents) of these headings. It must be also remembered that we assume that the infrastructure needed is available all the time, which is not the case in, for example, developing countries. It may also be useful to think in terms of technical support for teachers as being perhaps a pre-planning phase. It was assumed in the discussions that the drivers of the system (teachers) know how to use it properly, which is not a trivial statement. However, this is questionable while the complexity of the tele-education systems is growing.

The experiences of the participants gave a good mix of inputs into the discussion. Experiences reported were such as using videos and video conferencing for modular teaching in Europe (EUROPACE), emails and a shared noticeboard for student communication (Open University), tailored distance learning packages for industry (University for Industry), using the lowest common denominator for discussion groups (i.e. email as not all had access to newsgroups), studies based on information from two Universities with homogenised results.

Teachers' and students' new roles

For taught versus research and the spectrum in between, a feedback is required into the teacher's knowledge. With the research side, new knowledge can be created. In new subject areas students may be more up to date that the teacher, the question was raised: "how does the teacher keep control / respect in this case?" New areas perhaps need new pedagogy, for example the entire group learns and the teacher is just a guide rather than a leader. There is the question of how many providers and how many students are optimal. It depends of course on the type of delivery and the cost effectiveness, for example, fewer students in a graduate class is needed than you would have in a general email group. It may also depend on how many active students you have, for example in the context of a newsgroup discussion list. Teachers will need aids to help them control the flow of information, for example generally known procedures should be adhered to (e.g. teacher will not solve administrative problems). Of course there are problems for the teacher if they cannot answer all questions – this will challenge their traditional role as a teacher.

Community Aspects

In general, aspects such as the human-human interface (as well as the human-group, and group-group interfaces) need addressing. The examples discussed involved the emotional content of communications; it is much easier to fire someone you have never met, rather than having to do it face to face; if someone is angry or upset it is difficult to convey that by (for example) email, and perhaps video-conferencing might be more appropriate for some types of communications. It is also important that a community can exist with shared spaces (of whatever type) and can synchronise in time.

Synchronization of technology use

Synchronisation must also be considered in a distributed learning environment. Email is useful, there are also concepts of notice boards and exhibition spaces which may be the equivalent if black boards and class room walls respectively. The most important thing is to balance the use of technology and competencies of learners and teachers. Otherwise overload or undercapacity will emerge.

3.   Reflection on a case example; a distributed business game

Timo Lainema introduced the example – a business simulation to help executives and workers what the effect of their actions might be. It was agreed that different techniques would be required for different purposes, for example a system to teacher 100,000 garage mechanics how to tune an engine would be different from one which helped graduate research students understand quantum mechanics, where not all the possibilities are known. Learning if different from learning by experience / exploration / discovery. The triangle axes (see figure before) were useful for as a generic framework, but sets of solutions rather than a single one are. The business game, for example, has three phases i.e. setup, play and feedback.

All these should be moderated by an expert i.e. a facilitator, who will set up the system for the players, monitor the play and afterwards provide feedback. One problem is that the game might be too simple, and so it will be too similar each time, so it must be complex enough. However, it is probable that different types of users (e.g. groups from production, purchasing, sales, engineering, etc.) will use the system and this will provide and extra level of variation. Also contents of the game will affect results. A distributed system is required for a number of reasons, however it still sensible to allow a subset of the system to be a stand-alone system for smaller users, so rightsizing is important for effective game environments. Another main reason for having a distributed system is to allow added complexity by having multiple groups of users using the system at the same time and affecting each other. Groupings that use a computer moderator have been shown to be both quicker and more productive, balance between anonymity and identified contributions should be decided case by case. Another reason for having a distributed system is that you cannot actually get all the players physically together in one place or time (e.g. Sales Directors). You must also ensure that there are actual learning benefits for using the network rather than using it for its own sake and monitor the social aspects of communications (e.g. if a person is angry it should be taken into account by the sender / receiver). It may still be necessary to combine face-to-face meetings in order to have the full impact.

It is important to have some incentive and disincentive system for doing well / badly in the game in order that the players take it seriously enough. But not too much as they must learn by their mistakes and the teacher / facilitator may not know everything. It is also important to simulate things that cannot happen – or are extremely unlikely in order to simulate organisational change. The blackboard has to be flexible, so that anonymous as well as credited information can be entered, also it must have the ability to be open and closed to the outside world, as appropriate for different purposes in the simulation. The task of the teacher in the simulation is paramount. It should be decided are they as advisors , consultants or organisers or a hybrid version of all the roles? This will affect the design of the simulation, also it is important that it they are given the appropriate training in the use / control of the system.

4.   Conclusive remarks

It was generally agreed that further work in the area was required, as although we could decide what we thought about various scenarios and teaching / learning methods, they should always be supported or otherwise by empirical studies.

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