Towards Virtual Academy – Teacher's Changing Role

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Key words: Teaching, network, pedagogical way of thinking.

ABSTRACT

The paper will discuss the changing role of teacher while adapting to virtual academy. The new learning environments demand new teaching and learning skills. In this paper the viewpoint is teacher's. The experiences gathered at the Institute of Photogrammetry and Remote Sensing in Helsinki University of Technology are discussed. Beside the technological approaches the pedagogical approach is emphasized.

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1. INTRODUCTION

This paper is intended to be a base for further discussion. The paper is inspired by the ideas gathered during the past years when attending to the pedagogical training for university teachers and the various courses especially intended to enhance the skills for using information and communication technology in teaching. The author's own experiences as a teacher and as a learner in the net environment have effected a lot to the content of the paper.

The wide definition of virtual academy is applied in this paper. "Virtual academy is an academy, which works within an information network. It consists of a common understanding among its members to provide their knowledge, expertise and research products to each other and for co-operative use." Virtual academy "may function internationally and at any distance." (Haggrén and Munk Sørensen, 2000). Although not emphasized in this definition, the teaching and learning are essential parts of this academy.

However, to be able to discuss about the teacher's role, it is good to describe some basic concepts relating to the teaching in the virtual academy.

2. TEACHING IN THE VIRTUAL ACADEMY

2.1 Teaching in the Network

The quadrant analysis (see Figure 1) created by the Finnish experts in learning in the net, (Hein, Ihanainen, and Nieminen, 2000; Hein & Kairamo, 2000; Kairamo, 2001) has had a great impact on me, when it was presented during one training course. It has been created to clarify the field of teaching in the net. People discussing about virtual academy, eLearning, the use of information and communication technology in teaching etc can use very different definitions. They mean different things when answering to the question "What do you mean by teaching in the net?" The quadrant analysis is created from the answers into this basic question. The first dimension (product – process) answers to the question "Do we want to create a product or to create a process?" The second dimension (only network – network as one part of teaching) answers to the question do we have a pure network course or is the use of net one method among the other methods of teaching.

In the left quadrants the network is a distribution channel. In the right quadrants the network is an operational environment. In the upper quadrants the network is used as one method beside the other educational methods including face-to-face situations. In the lower quadrants everything is happening in the net.

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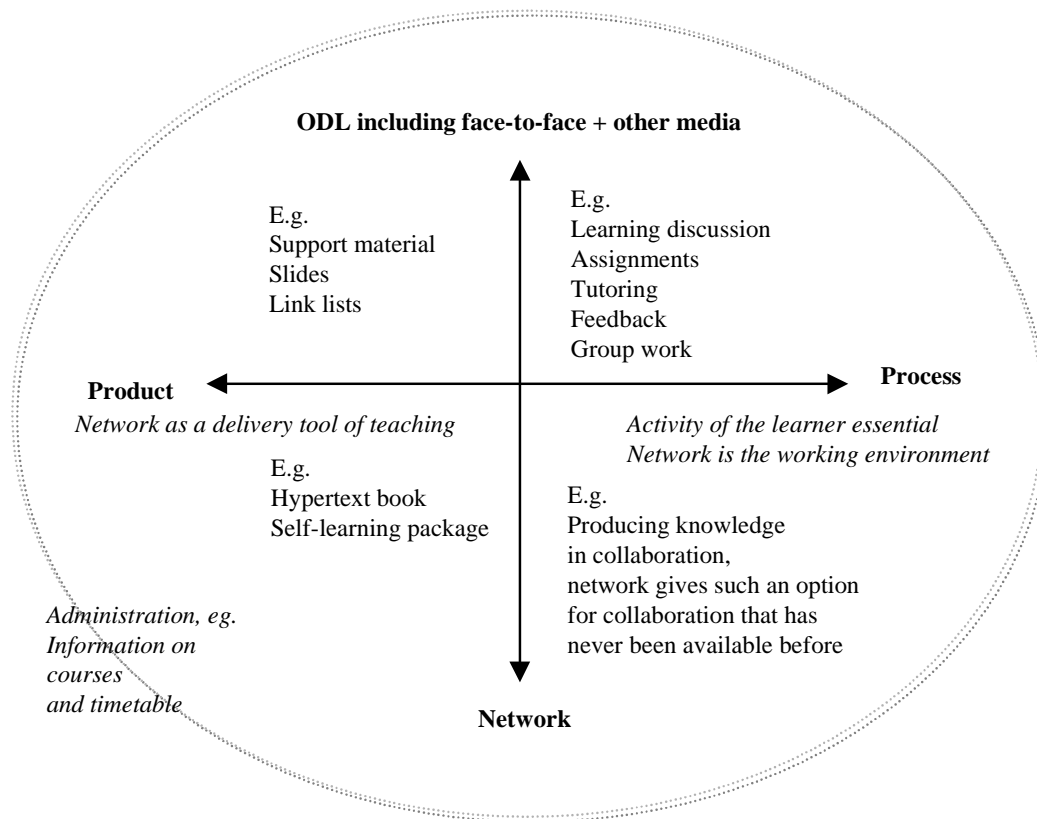Washington, D.C. USA, April 19-26 2002

Figure 1: Teaching in the network (figure by Hein & Kairamo, 2000)

We can consider where our course is currently located and where we want it to be in the future. The selection of available technical solutions differs depending on the quadrant. Also the pedagogical approaches can be very different.

2.2 Learning Environments

The supply of special learning environments or conferencing programs is continuously growing. During FIG Workshop and Seminar in June 2001 in Helsinki several of such systems were presented. We might consider the use of programs or environments like, for example, WebCT, Lotus LearningSpace, Blackboard, FirstClass or Fle. Basically all of them have very similar functionalities. Typically they contain elements for managing documents, communication (one-to-one or group), shared documents as well as administrative tools. Probably it is impossible to select the best system. The usability and the openness vary. Nor should we forget the open systems build using common facilities like newsgroups, html-pages and email.

However, when considering the use of learning environment, it might be useful to consider also the pedagogical way of thinking behind each system. For example, Fle (Future Learning Environment) is a web-based learning environment for computer supported collaborative learning (CSCL). (See, http://fle2.uiah.fi/ or http://fle3.uiah.fi/). Of course, in some cases the

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selection cannot be done by individual teacher or teaching unit. In some universities a decision has been made to select a same environment for whole university.

2.3 Creating a Network Course

The production processes of the network courses can be very different. In literature, the team for creating a network course can consist of following members: a project coordinator, the expert of content, the teacher or the tutor of network course (can be same as the expert of the content), the expert of network pedagogy, the www-editor, a programmer, a course secretary and a marketing person. In reality, it is not very uncommon that one or two person carries out all these assignments. However, it is good to understand that the creation of a network course requires several skills. It is a lucky situation if a small teaching unit, like an individual laboratory of the university, has these skills by themselves.

3. TECHNICAL AND PEDAGOGICAL REVOLUTION AT THE SAME TIME?

When teaching is going in to the network the teachers need both new technical skills as well as pedagogical skills to survive in this new environment.

Typically the going into network has started the evaluation of current teaching. Hein & Kairamo (2000) suggested this is due to the fact, that using information and communication technology in higher education brings the current teaching practices into daylight. Do we want to transfer our current teaching as such into network or do we need to adopt new pedagogical approaches at the same time? It is time to consider our pedagogical way of thinking.

3.1 Pedagogical Way of Thinking

Current pedagogical way of thinking like constructivism emphasizes the learning as an active process. To learn a student has to construct information in his/her own mind. The traditional role of teachers as information deliverers is not any more valid. The teachers can still serve "building blocks", but the students have to do the actual knowledge building process by themselves. There are several methods, for example, Problem Based Learning (PBL), inquiry learning or collaborative learning, which can be utilized to achieve active learning process. Of course, these methods are not restricted into network teaching.

It has to be remembered that the teaching traditions are varying in different countries and universities. For example, already a "lecture" can mean very different type of learning experience around the world. Even individual lecturers have their own style. A good example of differences in teaching traditions is the utilization of project-based learning. Some universities have utilized it for decades, for some universities it is totally new approach.

The pedagogical way of thinking can be unconscious. Still it has an effect to teaching. Therefore it is important that teacher becomes aware of his/her pedagogical way of thinking. This way the teacher can make real decisions relating to what kind of learning processes

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he/she would like the students to experience. After this it is possible to create adequate structure for the course to support this desired learning process.

3.2 Students in the Network

Often the studying in the net is based on very optimistic ideas of students attending to the courses. The students are seen motivated, independent, self-discipline, self-acting etc. Generally their studying skills are seen to be mature.

The virtual learning environment is often described with adjectives like freedom, independent from time and place and flexible. It can be also very demanding. The feeling of freedom and responsibility from own studying can be very confusing. This sets high demands for the mechanisms available to support the student's studying process.

Studying in the net can be a very positive and successful experience. But students can also get lost in the virtual cyberspace.

4. TEACHER'S ROLE IN NETWORK

4.1 Skills Needed when Teaching in the Net

Beside the new technical skills, teaching in the net needs several other skills that might sometimes be more challenging to achieve.

4.1.1 Network Communication Skills

The teaching in the network environment demands new skills and approach compared to the traditional teaching in the classroom. The network communication skills are essential. The network communication differs from traditional face-to-face communication. Usually the network courses are very much based on verbal, written communication. Especially in pure network courses the importance of these communication skills cannot be underestimated.

4.1.2 Time Management

The time management can be very different comparing to the traditional teaching. Traditionally teachers have had a specific time during the week when they are giving lectures and when they are, for example, having their receptions for students. Typically network is a very hectic media. It is impossible to be always attainable. Therefore clear decisions have to be made about the tempo of the course.

The common illusion relating to the studies in the network relates to the total freedom from time and place. Self-study packages can be really free from timetables or deadlines. However, if the study package is based on some kind of co-operation between co-learners, the course probably needs also a timetable. Of course, course can consist of synchronous or asynchronous parts. The latter gives more freedom to the individual students to decide about their personal time management during the course.

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The essential skill of network teacher is to create a realistic timetable and steering mechanisms for the network course. This supports the commitment to the course, which is essential to the successful learning results.

4.1.3   Special Characteristics of Network

The network offers new possibilities for teaching and supervision. One of these is the possibility to give personal feedback. The interactivity is another. Feedback and interactivity can be very important motivation factors when studying in the network environment. They can make the network environment differ from traditional teaching media and should be effectively utilized.

4.1.4   Creation of Virtual Community?

Students going through academic education learn also other things than explicit knowledge. A lot of this can be described with the term "tacit knowledge". The difference has also been described with terms knowing-that and knowing-how. At the same, students have gradually become members of academic community. This is a challenge in virtual environment, where students can be even globally distributed.

4.2 New Roles of the Teacher

The traditional roles of teacher and students are especially affected by the increasing interaction with the world outside the classroom. The teacher can feel the network either as competitor or as co-operator depending on his/her attitude. The network as such does not change the roles.

When using the new communication and information technologies in teaching, the good start might be to forget the traditional authority of teacher. I would like to describe teacher as a coach or a personal trainer. In many cases it can be even seen that teacher becomes a fellow student. In some cases the fellow student can even replace a traditional teacher.

The network environment is often fragmentary. In this situation one of the challenges for the teacher is to provide information management skills to the students. The teacher can also help the students to build the global view on subject.

5. CASE: PHOTOGRAMMETRY AND REMOTE SENSING AT HELSINKI UNIVERSITY OF TECHNOLOGY GOING TOWARDS VIRTUAL ACADEMY

5.1 WWW since 1995

The Institute of Photogrammetry and Remote Sensing at HUT has been actively using www-pages in teaching several years. The own www-server (http://foto.hut.fi/) has been officially available since January 1995. Professor Haggrén has been describing the use of www in

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teaching already in 1996. Afterwards can be seen that the selected strategy has been a good one.

The pages do not utilize any specific learning environment. Instead the study material has been put online as normal www-pages. The most pages are created and maintained depending on personal preference either by writing direct html-code (using normal text-editor like emacs) or using Netscape Composer. The lecturer of every course has his/her own style to maintain the course pages.

The Helsinki University of Technology maintains a course information system for whole university (http://wwwtopi.hut.fi/). This wwwtopi system contains, for example, the following functions: the course timetable, the ability to register onto the courses, exercises, or exams as well as the possibility to send email to the registered course participants. The system is actively utilized in course administration.

5.2 Introducing M-Net in 1997

Since 1997 the laboratory's wwwpages are developed based on the vision of Virtual Academy called M-net. (Haggrén & Sørensen, 2000). The basic phases to fullfill this vision have been the following:

- "The first phase in producing contents for the M-net has consisted transformation of analog teaching material to digital one and serving it both to the lecture rooms and for the students via network."
- "The second phase has been in activating students to produce their own works within the network and to publish the material for common use. Usually these have been seminar works and special assignments which are published as hypertext documents."
- " The third phase will be the interactive one where the teachers and students "solve" problems together."

5.3 Utilization of Network in Teaching in 2002

The paper of Haggrén and Munk Sørensen (2000) introduces modules, which are divided to pedagogic levels called "texts", "tools" and "projects". The fourth level is "research". The courses are composed from these basic elements, which are structured so that they support student's active learning process. An essential part of teaching is to connect current research into the teaching. The adopting of students as part of our academic community within the Institute of Photogrammetry and Remote Sensing is especially supported.

5.3.1 "Texts"

The utilization of network in the teaching has achieved a firm position in the Institute of Photogrammetry and Remote Sensing at HUT. In most courses the lecture material is available in the net. The lectures contain the detailed theory and links to the references. It has been interesting to notice, that the availability of the material in the net has not considerably reduced the lecture activity. However, it has given freedom to both teacher and students to

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concentrate on the specific subjects during the face-to-face lectures. Of course, it also gives the freedom for self-studying.

5.3.2   "Tools"

The so-called "tools" level is under continuous development. The tools can be quite simple (for specific task) or more complex. The "tools" are created for exercising the theory and parts of the technology. They can be done utilizing various software and technical solutions like Excel, MatLab, Java, C++, etc. It is an advantage, if the tools and the relating instructions can be delivered using Internet – even better, if they can be utilized without specific programs.

A good example of simple tool is the excel-notebook originally developed by Henrik Haggrén. The tool to demonstrate the theory of imaging in central projection is used during the lectures. In this way the tool becomes familiar for the students. Afterwards the students utilize the tool by themselves and return a short report. (Koistinen, 2001). The development of "tools" for different courses is continuing.

More complex "tools" can also be created. This is a part where I see great possibilities for co-operation within the international surveying society.

Excellent example of a more complex tool for education of photogrammetry is the Arpenteur (www.arpenteur.net). The Arpenteur (an Architectural PhotogrammEtry Network Tool for EdUcation and Research) is a web-based digital photogrammetric software for education purposes. The software is designed by two French research laboratories GAMSAU-CNRS and ENSAIS-LERGEC. (For example, Drap & Grussenmeyer, 2000). One step would be to integrate this great tool into our teaching.

5.3.3   "Projects"

The solving of practical professional problems when data and specifications are given is an essential skill for students graduating from us. This can be trained during the whole education. The skills to apply theory ("texts") and tools to practical problems can be trained within various projects.

5.3.4   "Research"

"Research" deals with the production of new knowledge and information. It is usually seen as part of post-graduate studies (including post doctorates). However, at least its results should be connected to the "texts", "tools", and "projects" levels in early phase.

6. CONCLUSIONS

The intention of this paper has been to start a process in the reader's mind. When entering to the new era of teaching in the net, every teacher should consider what is her/his own

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pedagogical way of thinking. Pedagogical skills have to be updated at the same time as we are updating our technological skills. Pedagogy and technology goes hand in hand.

Teaching in the net needs new skills. The new technical skills are probably easiest to adopt. The network communication skills, supervision skills etc might be much more challenging to learn. The teaching in the net will effect on the traditional role of teacher. Therefore I would like to recommend that all teachers should try studying in the network course. This kind of experience gives totally new viewpoints to analyse own ideas relating to learning and teaching. It should also be remembered that network offers great possibilities for co-operation. This should be really utilized when going towards the virtual academy.

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BIOGRAPHICAL NOTES

Katri Koistinen has graduated as M.Sc. in Surveying Science from Helsinki University of Technology in 1995. The same year she has joined the Institute of Photogrammetry and Remote Sensing as a research scientist and a post-graduate student in Photogrammetry. Since August 2000 she has been the Teaching Assistant in Photogrammetry and Remote Sensing.

Due to the interest in pedagogical matters she has been actively taken part to the available pedagogical education for the university teachers – especially the use of information and communication technology in teaching. Currently she is participating for the national training programme organized by the Finnish Virtual University.

The author has been a board member in The Finnish Association of Geodetic and Land Surveyors since 1998.

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