

# **New Technology in Learning Environment for Surveyors**

**Esben MUNK SØRENSEN, Denmark**

## **SUMMARY**

Aalborg University in Denmark participates in a large staking in developing new digital, virtual learning environments. These technologies are expected to become very important for the development of the institutions of higher education in the years to come in order that these will be able to service society in still more ways through co-operation, research and education, including distance education and further education. An E-Learning Lab Northern Jutland has been established, which is a laboratory for the new media. The laboratory services both the university and other educational environments in the region. At the Surveying Programme of Aalborg University more educational experiments have been carried through.

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## **1. INTRODUCTION**

The Internet development has created the possibility of a new communication and learning culture at the universities. Today the Internet has given the researchers and the students a direct, “under the fingertips” access to the total sum of the knowledge of the whole world. Operations, which were previously linked to use of the local department library or the university library, where scientific monographs and magazines were accessible, have now been supplemented with interactive search processes in, supervision in and participation in the creation of new knowledge, which will be at the Internet the same moment it is created. In that sense we are beginning to view the Internet as the total sum of the knowledge of the whole world.

An the single learning environments – the departments, the educations, the researchers and the teachers – must learn to master the new technologies to document and impart their results and knowledge to all, at the same time using the new information and communication technology to develop platforms for education, co-operation and research.

The goal of the university’s staking on this ICT development is partly to develop the university pedagogy in general, but especially the university wishes to use the new technologies to increase the quality, create increased transparency of the knowledge resources of the university and finally to develop an improved basis for internationalisation of the activities of the university.

## **2. THE VILL PROJECT UNDER THE DIGITAL NORTHERN JUTLAND**

The Digital Northern Jutland is a regional development programme for the region, in which Aalborg University is located. The university has been participating in this development programme with the ViLL project, the superior aim of which is to contribute to the development of Northern Jutland as a learning region and as an active partner in the globalized network community by bringing into focus ICT-based methods and systems for promotion of lifelong learning.



The learning environment at the Surveying Programme of Aalborg University is organized in projects, where the students work in groups. In their group rooms they have placed their network-connected computers, and in these working rooms they work with their projects and solve their tasks for the relevant courses.

The ViLL project works analogously at two levels. First by supporting concrete ICT implementations in ordinary educations and in further educations with a view to collect large-scale experience from coherent virtual learning environments and the virtual learning forms and systems represented in these experiments. Secondly the establishment of the E-Learning Lab Northern Jutland, which in future will be extended and consolidated, if possible, as a combined research, development and knowledge centre around E-Learning in the North Jutland region. This will hopefully imply – and this is already happening – that Northern Jutland is placed on the maps of Denmark and the entire world, when it is about ICT-based learning. A strategic supplement to the problem-oriented learning model which is already the university's hallmark and for which the university has obtained recognition.

### **3. THE BEARING MARKS OF THE VILL PROJECT**

The ViLL project under The Digital Northern Jutland has a number of superior goals – bearing marks – which are to strengthen the competence development and secure up-to-date competences in Northern Jutland to identify, develop and test new virtual learning forms and ICT systems so that all through life humans get relevant and flexible possibilities of participating in education and further education of a high quality to establish, run and embed the E-Learning Lab Northern Jutland which can contribute to the ICT competence

development methodically and operatively among teachers and human resource persons to develop new educational tools by way of programs which tailor technological solutions for specific needs in precise educational connections to evaluate education-technological solutions in relation to the organizing and pedagogic challenges ruling at the educations, where the solutions are used to strengthen co-operation between educational institutions and enterprises to strengthen the regional knowledge development and knowledge division as competition parameters in the global network community.

#### **4. CO-OPERATION BETWEEN UNIVERSITY, NORTHERN JUTLAND AND INDUSTRY**

The ViLL project was established under The Digital Northern Jutland as a co-operation project between the university, the region and the industry. The ViLL project bases on a consortium of the following active partners: The Northern Jutland University Foundation and the Spar Nord Foundation, represented by Aalborg University through the IT Innovation (ITI), EUC NORD, Ericsson Denmark, Telia Telecom A/S and IBM. Every project partner has appointed an executive responsible leader. ITI is project-responsible in relation to the whole ViLL project. The total project sum for the ViLL project is 15.1 million DKK covering an equal co-financing between the Aalborg University Foundation, the private co-financing and the Ministry for Research with the last third.

The project is managed by a steering committee the chairman of which is the executing responsible person of the ViLL project. The chairman of the steering committee is the author of this paper. The steering committee consists of a number of internal AAU representatives supplemented by one representative from each of the other project partners, represented by their executive responsible leader.

#### **5. E-LEARNING LAB NORTHERN JUTLAND**

Centrally in the ViLL project is the E-Learning Lab Northern Jutland. The laboratory is a place, where the development of new virtual learning environments and learning forms are supported by access to the newest technology, to the newest research-based knowledge on ICT and learning, to consultancy and to concrete experience on ICT in the different learning connections. There are four columns in E-Learning Lab Northern Jutland:

- Facilitation of experiments with the newest technology.
- Consultative assistance by way of pedagogic or technical consultancy for the educational experiments, etc.
- Exchange/procurement of experience by way of running of a network on ICT-supported learning forms, etc. and establishment of a 'best practice' data base with web-interface containing concrete experience in the field from Denmark and abroad.
- Research by way of systems development and method development integrating the work in the laboratory with the experience of the users and the newest research in the field.

E-Learning Lab Northern Jutland is so saying a combined research, development and communication centre, which both in the project period and subsequently brings into focus a

continued development of virtual learning environments. E-Learning Lab Northern Jutland attends to research, development and communication related to the specific educational and development experiments held by the ViLL project, and communicates the knowledge about e-learning broadly within the whole Digital Northern Jutland in the rest of Denmark. Besides, the E-Learning Lab Northern Jutland commands partly hard- and software and partly the necessary running means as well as the following person resources by way of one research professor, two PhD students, pedagogic/organizing consultants (1.5 man-year), technical consultants (1.5), systems administrators (3) and secretarial assistance (0.75).

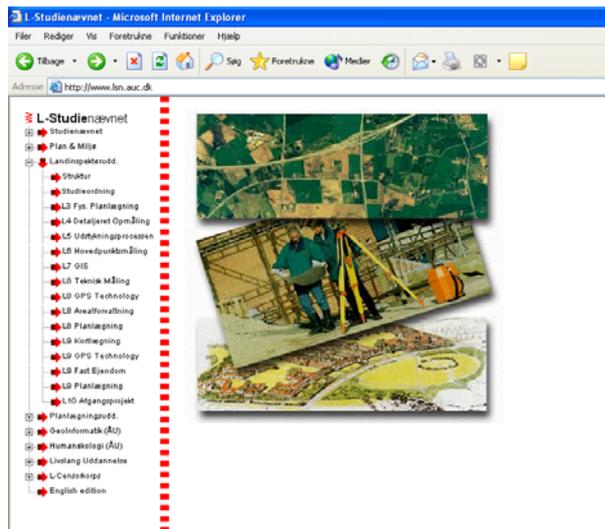
## **6. EDUCATIONAL AND TECHNOLOGY EXPERIMENTS**

A number of activities have been carried through in the E-Learning Lab. These activities affect many of the university's educations in different ways and base on technology adaptation and possibly self-development, competence build-up and further organisation development. Centrally in the local communication activities of the laboratories are workshops, which so far have dealt with topics like Synchronous Communication, IT Support for Project Work – Co-operation and Facilities, Didactics in the Virtual Space and test, analysis and discussion of different types of IT systems for learning (conference systems, contents distribution systems, groupware systems, knowledge mapping systems, streaming-video as educational material.

In addition educational experiments are carried through, where a number of the educations of the university are involved. These are both the university master and bachelor educations as well as distance educations. The distance educations have been IT-supported for more than 10 years and have rested on reliable systems like FirstClass, etc. This concept is subjected to a considerable change due to the many multimedia-oriented Internet technologies which challenge and change our learning environments all along.

## **7. THE DANISH SURVEYING PROGRAMME PARTICIPATES IN THE EDUCATIONAL EXPERIMENTS OF THE VILL PROJECT**

The Danish Surveying Programme has already reached far as regards facilitation of the students' learning environment with ICT support. The students all have access to the Internet from their group rooms, which is the physical common room for the students in the project-based learning process that characterizes the whole education. The students have, besides mail account, also individual storage resources at the net, and the entire local study administration with course descriptions, course documentation, group surveys and supervisor resources is organized in a large web-site ([www.lsn.aau.dk](http://www.lsn.aau.dk)). In addition the students have access to digital map data, aerial photos, satellite photos, digital property data, etc. via a special spatial data library. In spite of this relatively high stage in ICT facilitation, development tasks are still running. These tasks have been carried out in connection with the educational experiments of the ViLL project (see below a-e).



The illustration shows the entrance to the homepage for School for Surveying and Planning at Aalborg University. There is dedicated information for students on all levels at the Surveying Programme.

### 7.1 A. Course in “Environmentally Based Property Improvement” at the 9th Semester of the Surveying Programme

Through the years 2000-03 there has been developed a digital course room at the Surveying Programme for a course in Environmentally Based Property Improvement. The course stretches over five half days in every autumn semester. The course has been followed by about 50 students through these three semesters. In connection with the course in 2003 a separate evaluation by one of the consultants of the ViLL project was carried through. This evaluation is reported separately in a report elaborated by Kristian Kaaberbøll.

The digital course room has been built up in Lotus QuickpacKursusholder and comprises curriculum-fixed reading material for each of the five course days. In addition, overheads and tasks were accessible in the digital course room. The course was carried through as an “on-campus” course, where the students from the group rooms with on-line access to the conference could get texts and hand in tasks, which are then accessible to all participants of the course. The pedagogic setting of the learning sequence over one course day is thus supported by the local IT infrastructure so that tasks handed in can subsequently be studied in plenum with slides and answers collected from the conference room.



At the homepage of the course there is access to all types of digital documentation: Texts (.pdf), tasks, related scientific documentation, slides but also video for Streaming to the lecture theatre and for the students at their working rooms and at home

For one of the course days there was video support for the lecture. Here a record with a case from practice can be played as streamed video to bandwidths from both broadband access and via a 56k modem connection.

The course is reviewed at the time of writing (January 2004) by two chartered surveyors from practice with a view to quality assurance and improvement of tasks, etc. This takes place in order that “the digital learning room” can be placed at the disposal of practitioners within the field and for re-education of professionals within the professional field of the course. This is of interest, because the code of practice around land consolidation cases (and with that environmental property improvement) has just been revised, and the implementation of projects in practice is subsequently to follow new procedures.



The students submit their task solutions in plenum at big monitors. They have sent their digital report from the group rooms to the class room.

## 7.2 Re-organisation of the Master Education in Geoinformatics

The original – and narrower – aim of the ViLL educational experiments under the L-Study Board was to reorganize the course rooms of the “off-campus” Master Education in Geoinformatics. This should be done in such a way that these course rooms could be followed as diploma courses and single subject courses without the students in question having to follow the entire two-year education and carry through the project work in full. It soon proved that this reorganisation could be carried through without changing the information technological concept for the education, where the conference activities are carried out on the basis of FirstClass, which has been running at the education since 1996.

This part of the educational experiment implied that at the admission of new students at the master education in summer 2003 eight students were admitted as single subject students. It was not necessary either to reorganize the course rooms besides a professional and topicality updating of the contents.

All course subjects at the “off-campus” education in Geoinformatics now also form part of a new specialisation in Spatial Information Management and the graduate part of the Surveying Programme. This development work has taken place concurrently with the reorganisation of the MTM Education, which was planned as the original contents in the ViLL educational experiments.

### **7.3 Investigation of Systems – Preferably Open-Source – to be Content Management System for the Surveying Programme**

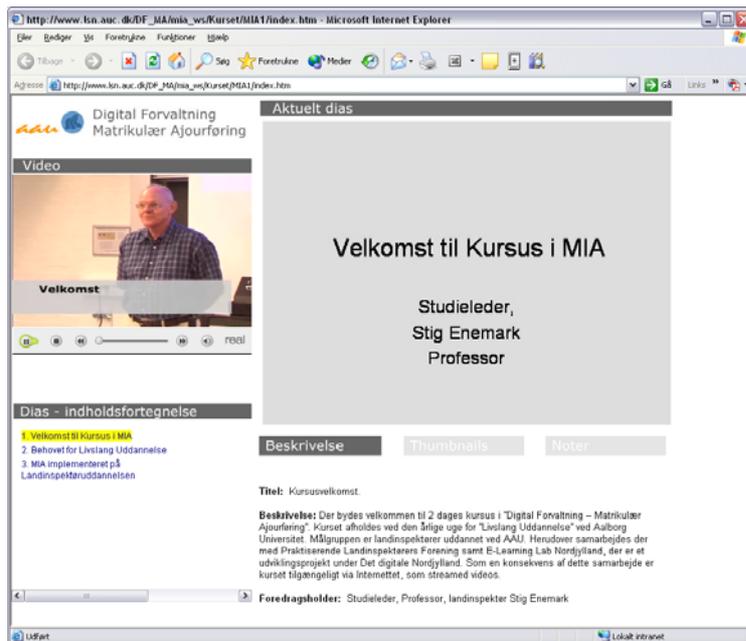
The Surveying Programme has already at the beginning of the educational experiment a fully web-supported study administration, where all documentation concerning the running of the study units was browser accessible in an open working environment without password protection. This web-site is programmed in HTML and is not based on a CMS system. As part of the educational experiment Geoinformatics an investigation of relevant open-source systems, which could be recommended for operation at more educations, was therefore started at the request of the ViLL consultants. The study management had great expectations to the presentation of a central institutional recommendation in this field, which like the running of FirstClass in many distance educations could create a strong central operational environment for CMS system for the “on-campus” educations. Such a recommendation was, however, not possible, and this left the further development of the web-site based on the CMS system of the Surveying Programme in a considerable vacuum. In consequence, a development of the web-site of the Surveying Programme to a CSM system was started in the autumn. This development was not co-ordinated with other ViLL educational experiments, but solely based on the same CSM system which is used by the own web-site of the Department of Development and Planning and by educational web-sites of the Geography Programme and the MSc Education in Engineering (Planning and Environment).

### **7.4 Streamed Video for Lecture at Thematic Learning Room for “Digital Management – Cadastral Updating”**

The profession of chartered surveyors is facing a great challenge in re-educating the line to Digital Management within Cadastral Updating. This is the core function within registration and development of real property of the chartered surveyor. An overall Cadastral Information and Updating System (MIA) has been developed commercially for use by practising surveyors in connection with case preparation, procedure and sending in to the Danish National Survey & Cadastre.

In connection with Lifelong Education at the Faculty of Engineering & Science in August 2003 a two-day “on-campus” course was held with lectures and exercises. In co-operation with the E-Learning Lab’s “stream-team” all events on these two days were video-recorded. Subsequently a compression and file organisation took place, which allows playing of these records as streamed video.

These records have subsequently been programmed together with PowerPoint slides from the lectures, the exercises and examples as well as accessible documentation on digital management in general and MIA in particular in an overall thematic learning room with the title “Digital Management – Cadastral Updating”.



Stig Enemark, Head of Study Board, addressed words of welcome to a further education free of charge for chartered surveyors. At this specific web-site with the subject Digital Management – Cadastral Updating there is access to as much as two days of lectures, task examples and digital books and reports on the topic.

This overall thematic learning room is now running and can be used by all the students of the Surveying Programme and by chartered surveyors in occupation as a free offer of goal-directed further education within this strategic knowledge field.

This thematic learning room has been prepared and financed in co-operation with the Association of Chartered Surveyors in Private Practice. It is estimated that close to 300 persons will be able to profit by using this thematic learning room in the next half year.

## 7.5 Shift from ISDN to IP Technology in Connection with the Holding of Video Conferences Between Melbourne University and Aalborg University

Since 1996 a distance education course in Data Quality has been carried through at the Master Education in Geoinformatics, where an Australian professor from Melbourne University has been the course leader. This 1 ECTS course has been organised in a FirstClass conference with a duration of two weeks. As start-up of the course the Australian professor has since 1996 held a synchronous lecture in video conference based on ISDN technology with use of three simultaneous telephone lines. This course has been carried through in all the years since then with great success.

It has, however, been connected with rather large individual costs for the video conference, as the price for a two-hour sequence has been about 6000 DKK. Alternatives have therefore been considered continuously.

In January 2004 a test of the video conference facilities of the E-Learning Lab was carried through based on IP standards. This took place in such a way that the first lesson of 45 minutes used ISDN mode (the video conference laboratory at Sohngaardsholmsvej) and the second lesson of the same duration used IP technology (the E-Learning Lab at Kroghstraede 3). The experience was that the IP technology and the use of the Internet as transmission medium is fully on a level with ISDN at ordinary speech, image display and illustration of PowerPoint slides. Only once when a transmission-demanding animation of the spread of a forest fire was to be visualized there were “cuts” in the transmission.



Digital video conferences between Aalborg University and Melbourne University have been in operation since 1996. To the left the lecture with the “old-fashioned” telephony (ISDN) is shown and to the right the “new technology” (IP mode). The transmission costs to the left are 1000 dollars an hour. To the right the costs are 0 dollars an hour.

On the basis of this test it can therefore be recommended that IP mode is used for synchronous video conference in future. Technologically this is satisfactory and in addition very attractive financially, because there are no explicit transmission costs in connection with the implementation of the video conference.

## **8. EMBEDDING OF THE EXPERIENCES AND CONTINUED DEVELOPMENT**

The grants for The Digital Northern Jutland expired with the end of 2003. Therefore internal negotiations are presently (winter 2003/04) going on about embedding the competence built up. The quite dominating, superior experience with the ViLL project – besides the concrete educational experiments and other activities – is that there is a need of still more focus and resource supply to meet “the digital challenge”.

The speed of the pressure of change is increasing, and the next challenge for an institution like Aalborg University is to make the necessary adapted effort. The Digital Northern Jutland – here the ViLL project – has been a considerable lift and gives valuable competence and experiences.

However, the next phase will demand re-prioritizing at the educations and focus on strategic partnerships with other educational institutions and with the practice. The challenges of a “narrow” and small profession like that of the chartered surveyor are not only national. During the next 5-10 years it is very likely that the Surveying Programme in Denmark is made partly bilingual and partly forms part of a closer and still more specific Internet-based co-operation with sister educational institutions in other countries.

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