Videoconferencing in Surveying Education Programmes Needs New Institutional Capacity
- From One-campus Activities to Multi-campus Functions

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Key words: Surveying programme, videoconference, 2.0, e-learning, virtual university.

SUMMARY

The paper presents the use of real-time videoconference at Aalborg University and especially how it has been used to develop the university to run bachelor and master programmes in a "twin-campus" mode. Before 2007 it was only possible to follow the chartered surveyor master programme as a student at the main campus at Aalborg University located in the city of the same name. From 2007 it is possible to follow the same chartered surveyor master programme being a student at the capital Campus of Aalborg University, located in the Danish capital Copenhagen. Classes at the same year of the bachelor and master programmes have the same course schedule and the same lectures. It is possible by using quite advanced conference facilities at both campuses. The lecturer is travelling from campus to campus so the students meet him/her every second class. Through the implementation of this twin-campus policy it has been realized that the facilities can be used for many other functions in the campus life. More twin-campus programmes have been started and the facilities in used for meetings, examinations and much more.

Much focus on the implementation of this "twin-campus" strategy is given to teach the learners to manage and behave in such high tech lecture theatres. By examples from the surveying education programme the paper will present methods and lesson learned. This new learning mode as new technology not only gives new possibilities in training students but also how this course and learning mode ask for communication methods in the lecture theatre and a new institutional capacity in managing studies.
Using videoconferences at Aalborg University for university partnerships with the surveying community started in 1997 as a project between Melbourne University and Aalborg University. Today the technology is much more advanced and cheap and the actual use at Aalborg University represents an important step towards new concepts of co-operation between campuses.

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1. INTRODUCTION

In these years learning environments all over the word are challenged by the general development within the information and communication technology. Universities are old learning environments resting on scientists, who also teach, scientific publications, libraries, lectures and laboratories. Through the last two decades these old learning environments have been challenged and developed by the Internet and its belonging communication and documentation facilities which mean a fundamentally different and more efficient access to knowledge and documentation. The appearance of mails, world-wide-web and still more broadband for communication, server capacity for storage and processor power for the user interfaces have changed the accessibility to scientific documentation and communication and have challenged all known learning processes with that and thus also the universities.

In exactly these years the development in and around the video medium at the Internet is accelerating. New technologies for storage, distribution and editing of digital video are spread hurriedly at existing websites, and it has been possible to transmit video recordings both in real-time and as streamed video from servers to Internet connected screens and devices.

Video conferences are a part of this development. Video conferences make dialogue, story and communication between several locations possible. The dialogue can take place face-to-face, from one person to many and from many to many persons. With that video conferences have a high flexibility in relation to situational communication and are therefore applicable at and between universities for any communication task.

It is the author's point of view that also this part of the technological development of the Internet concerning communication and documentation will continue to change the conditions for the universities and their learning and research environments. Video conferences open many possibilities in streamlining communication and dialogue and with that also the different aspects of the learning process.

A very tangible application of video conferences is holding of courses based on a lecturer, an audience in a seminar room or an auditorium and a dialogue of assignments and the students' presentation of those. The use of video conferences in this way makes it possible to lecture in real-time to more than one campus or location at a time. In this way a course lecture can be transmitted or broadcasted to several places at the same time and in the same process, and the same dialogue and exchange of points of view between lecturer and audience can be created in the same way as during a lecture where everybody – lecturer and audience – are present in the same room.

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2. SURVEYORS IN DENMARK

2.1 The profession
The chartered surveyor profession in Denmark consists of around thousand gainfully employed chartered surveyors.

On third is employed in the cadastral sector consisting of private companies owned by licensed chartered surveyors with a monopoly to accomplish cadastral work such as subdivisions, land transfer and property formation like condominiums and similar. These private cadastral chartered surveyor companies prepare cadastral work for The National Survey and Cadastre, who administers the national land register and belonging atlas which has been completely digitised in Denmark since the mid nineties in the last millennium. A chartered surveyor in Denmark has a five years academic education, and after three years experience in cadastral work he can obtain a personal licence to perform cadastral work and be an owner of a licensed surveying company.

One third of the chartered surveyors is employed with private mapping companies and with private consulting engineering companies. Danish mapping companies (COWI, Blominfo, etc.) are among the most important in Europe and are solving tasks all over the world.
One third of the chartered surveyors in Denmark is employed within the public sector – the state, regional authorities and the municipalities. Here the chartered surveyors are working with spatial planning, land administration and management and the development and management of the public road system[1].

2.2 The education programme at Aalborg University
Chartered surveyors in Denmark are graduated from Aalborg University, which is the only university in Denmark delivering bachelor and master degrees to be a chartered surveyor. The university is also authorized to deliver PhD-grades and has own specific PhD-schools for this purpose.

Aalborg University is a young university which was started in 1974 as a part of a national development programme in order to offer the rural and remote areas in Denmark more favourable conditions of growth. The university has today 14,000 students and xxx PhD students. There are 1200 scientific employees and 800 employees in non-scientific occupations. The university's externally financed research is increasing significantly in these years because of the university's special focus to co-operate with the industry and through performance of strategical research projects. While other universities in Denmark have been forced to reduce the staff of scientific employees through dismissals, the situation of Aalborg University has been characterized by continued growth and will to readjust research and teaching towards the special requirements of the society and industry.

The surveying programme is a part of the Faculty for Engineering and Science and consists of a three year bachelor programme ("Cadastral Surveying Science") and two lines of master programmes ("Measuring Science" and "Land Management"). The two master programmes

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[1] For an actual analysis of the Danish profession of surveyors, *Sorensen and Enemark (2010)*.

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can be followed by English-speaking students. Both the bachelor degree and the master degree are necessary to be a chartered surveyor in Denmark.

3. PROBLEM-BASED LEARNING

3.1 The classic concept of PBL

When Aalborg University was founded in 1974 it was decided that all the university's educations should be arranged according to learning principles about problem-orientation and project work. In this way a distance was made to the traditional textbook learning and traditional lectures and courses which through centuries have been the dominating form of learning at universities and institutions of higher education.

Instead all the university's educations should be developed around the same learning concept that the students at the individual semesters learn in small groups or teams (2-4 students) to solve problems within the given themes of which the semester/study unit has been built. This learning model was at that time very modern, and it built on interdisciplinarity and cross science as a basis of theoretically and academically anchored problem-solving. For the problem analysis and the problem-solving of the learning process the students should use accessible literature and course syllabus and in their common group teamwork they should report on the learning process by working out a report which then was the basis of the examination.

This learning model has been used at all the university's educations and at all levels just as the problem-orientated access to problem-solving also has been characterized by an important part of the university's research.
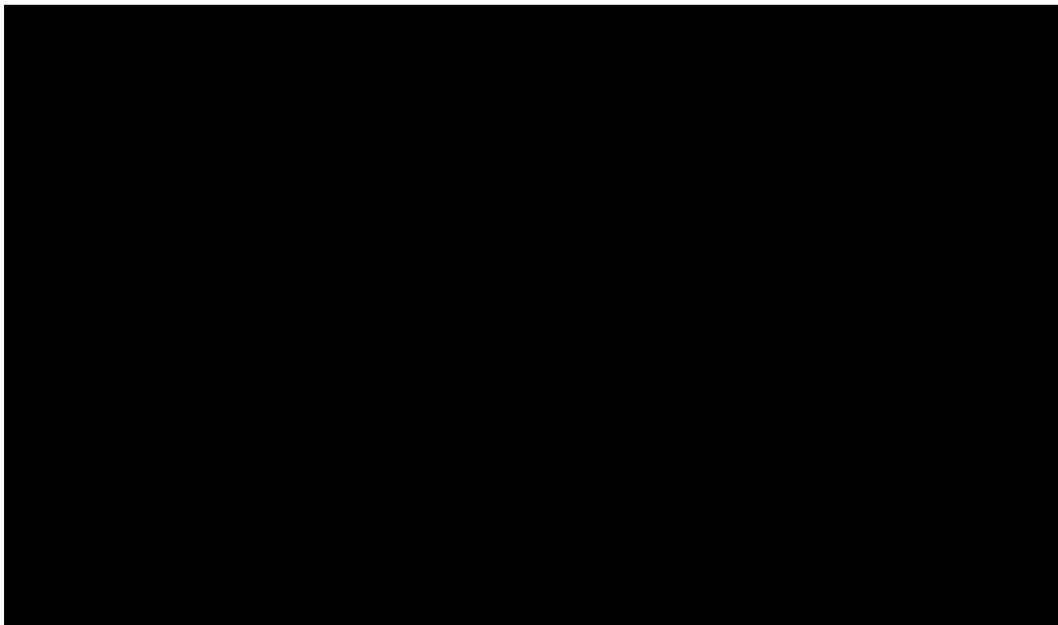
3.2 Problem-based learning 2.0

Concurrently with the development of the multiform resources of the Internet, the accessibility to data, knowledge and scientific documentation have been changed significantly. Classic resources, the university's resources such as research libraries, textbooks and scientific periodicals are now mainly digitally accessible on the Internet. Today university students have therefore access to an immense number of research based documentation and straight from their Internet connected gadgets, laptops and personal computers.

At Aalborg University the development of tools for collaborative learning meant change of the working processes in the project-orientated study. Earlier - during the university's first 15 years the working out of a project report as documentation for learning and problem-solving demanded that the students were able to use typewriters and operate printing machines. Then the pc-based word-processing packages were developed and since the tools for on-line/wired collaborative working on the same document or project report has been developed. Added to this comes that picture handling, digital picture handling in text and video medias have improved the conditions for working out common projects with belonging analysis, modelling examinations and theoretic studies.

The students at Aalborg University are serviced individually and in the project groups by a well-developed digital infrastructure with mail, resources to own websites, common drive and fixed/wireless networks. This means that the students are always wired and during courses in seminar rooms and auditorium they can interact in their mutual and daily dialogue about project work and other professional small talk with the global resources of the Internet.

The basic learning model – the problem-orientated and project based study – is, however, still the same. But the learning environment around this process has changed completely, and it utilizes exemplarily the digitally accessible knowledge and documentation at a maximum. In the project the students co-operate today with common net-based file libraries, write in common documents and plan the daily work in the project group using digital planning tools, project management, agreement calendars and communication supporting tools such as Skype, Messenger and similar just as social software – 2.0 – is used where relevant.

The learning environment today – problem-based-learning 2.0 is thus a modernized and top modern learning method – at the same time classic and very innovative. The innovation is created in this learning environment because the individual lecturer gives the students access to updated knowledge nationally and globally all the time. With the problem-solving as a learning instrument and accessible global Internet resources the learning environment becomes permanently dynamic and catches new trends, new technology, new knowledge and new methods in the students' learning process.

As documented knowledge and research documentation grow exponentially in these years and the total amount is still increasing, problem-based learning 2.0 is with that a special future-orientated learning model providing the students with basic competences to an extensive

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degree of self-organized learning and innovation competence. These basic competences both to use the Internet and also to self production of contents to the Internet mean that they are basically trained in using, quality ensuring and increasing in value the knowledge which they find on the Internet – and which are replaced almost yearly – for problem-solving and creation of products – are documented in the report. The total learning environment in problem-based learning is by this ensured a permanent and continued renewal and access to an updated learning environment – driven by the students' curiosity and the university's demands to solve problems.
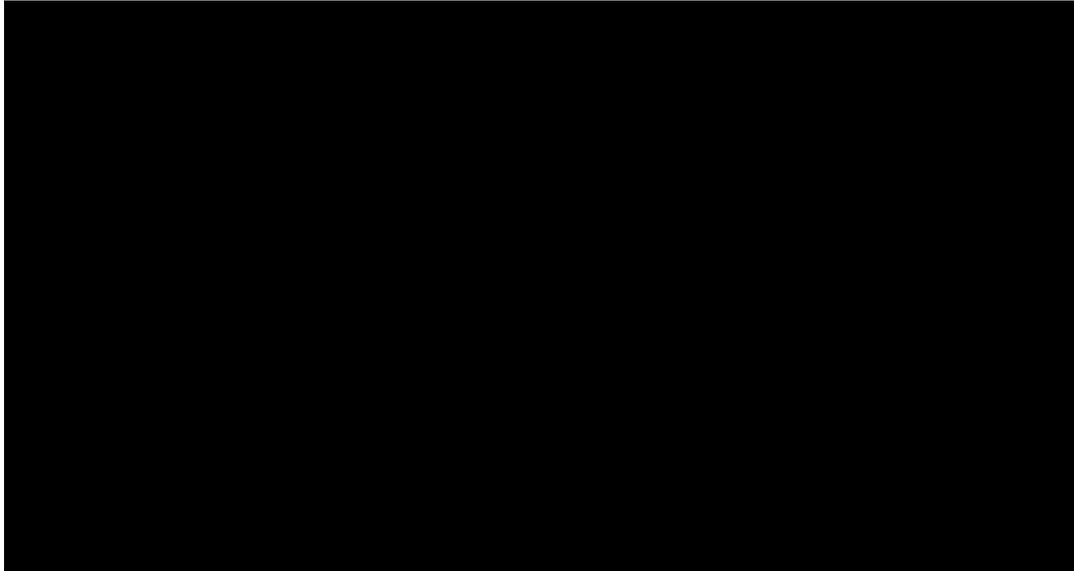
The problem-based learning at Aalborg University – the version 2.0

4. MORE SURVEYORS NEEDED

Since the start of Aalborg University in 1974 30-40 students have been admitted to the surveyor education each year. Out of this number approximately 30 students have finished their education each year with a Master degree within Surveying, Planning and Cadastral Science. The employment possibilities have generally been good for fully-qualified candidates, and in 1999-2000 a goal was formulated to admit 60 students to the education each year. Marketing and other initiatives resulted in an intake of more than 50 in 2000.

4.1 Decreasing number of students

Since 2000 the number of applicants has decreased, and in 2006 it was again critically low around 30 applicants. Almost all the applicants came from the remote and the North Jutland regions of Denmark where Aalborg University is situated while relatively few came from the metropolitan area around Copenhagen – the capital of Denmark.

4.2 Great future generational change

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The Danish chartered surveyor trade demands more chartered surveyor candidates. The age profile among Danish gainfully employed chartered surveyors are characterized by a rather large part of the total amount of chartered surveyors will retire on a pension during the next 5-10 years. Assuming that they will be replaced by new younger chartered surveyors, extraordinarily many newly qualified will be needed in the coming years. Therefore they want to increase the education capacity in the metropolitan area.

4.3 The geodata community asks for more surveyors in Spatial Information Science

Generally the mapping and geodata trade want more experts within geo informatics, photogrammetry and modern surveying. The universities are exposed to many complaints that there is a shortage of experts within the modern Spatial Information Science who can take part in the ongoing use of coordinator and location decisions within mobile communication and digital administration with geo-technological core competences.

5. NEW CAMPUS IN COPENHAGEN – THE CAPITAL OF DENMARK

5.1 Aalborg University in Copenhagen

When a resolution taken by the Danish government determined that in 2001 Aalborg University had to merge with The Danish Building Research Institute – a complete research institution for knowledge and development of the built-up environment without students – Aalborg University decided to offer the chartered surveyor education in Copenhagen in own campus. At the same time other educations were established within medialogi, humanistic informatics in the Aalborg University campus. Educations which beforehand were not offered in the metropolitan area.

The name of the Aalborg University campus in the capital was decided to be Copenhagen Institute of Technology. It was placed on the same campus as the Copenhagen University College of Engineering offering bachelor degrees in civil engineering. The boards of the two institutions – Aalborg University and Copenhagen University College of Engineering -

5.2 The surveying programme at CIT
The aim of establishing the chartered surveyor education was to recruit more students and geographically goal-directed against the regions of Denmark from which only few chartered surveyor students had come.

The first class of students at the programme for chartered surveyor's science started in the autumn 2007. In 2008 and 2009 new classes of surveying students have started on the CIT-campus.

5.3 Twin-campus concept for one education at the AAU-surveying programme
The concept of the Aalborg University chartered surveyor education on two campuses can be summarized in one headline about one education in two campuses. The concept consists in maximum common operation of education on two of the totally three campuses at the university.

Maximum common operation consists in the fact that the education both places has the same board of studies, has the same customer panel and belongs to the same Schools of Architecture and Planning. The common administrative affiliation makes it rather easy to plan the common operation in praxis.

During the first academic year – the basic education – the chartered surveyor students follow other study programmes in their respective campus (geography and graduate engineers in urban and energy planning) and during the first academic year there are only few common activities between the two teams of chartered surveyor classes. However, there are some common activities such as study tours, introductions and professional workshops, and for these activities video conferences between the two classes are used where relevant.

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From the second academic year – the third semester – the chartered surveyor students follow the common planned semesters – i.e. with the same calendar, and it means that there is a great demand of using the modern information technological tools to create a study environment with maximum cross campus communication and networking.

6. CROSS CAMPUS COMMUNICATION AND NETWORKING

6.1 Common courses on two campuses
During the second and third academic year courses are arranged for two year groups according to a common timetable. There is an almost complete synchronized timetable between the two groups.

Real-time videoconferencing has functioned the last two years between two campuses at the surveying programme at Aalborg University, Denmark. The lesson learned points out, that it is necessary to learn the learners and involve the students in running the system.

It is therefore possible to optimize the professional course teaching as synchronized video conferences. In this context synchronized means real-time video conferences between two groups of students. Each group includes up to 30 students and the characteristic is that the lecturer is present in one campus together with one group of students while the other group of students follows the conference from the other campus location.

The real-time form makes a dialogue possible between the lecturer and the students in both locations and also between the students in the two locations. In each location 1-2 video cameras send sound and pictures to the other location which is provided with 1-2 big screens for visual support of the sound transmission from the other location.

The system is flexible and gives great opportunities for face-to-face dialogue as a part of the pedagogical principles for running the courses.

6.2 Managing common courses for the two campuses

The common planning of this synchronized course arrangement is temporally quite simple. Both campuses are placed in the same time zone which temporally makes it rather simple to arrange the common operation.

The chartered surveyor students in the two campuses have the same timetable for the course. One secretary is responsible for the semester, and she makes the common arrangement of timetables for both locations. The administrative simplifications are an advantage, but on the other hand reservations of the respective auditoriums with video installations demand a careful and time consuming effort for the involved secretaries and educational co-ordinators.

6.3 Interactions

When the lecture has started, the lecturer has the responsibility for two groups of students. He is together with one group while the other group is in the remote location. Of course the lecturer can see, hear and discuss with the students who are together with him in the same room. But by virtue of the video equipment he can also see the students in the other location, and they can also see him on the screen.

Experience shows that it is important that the lecturer pays attention to the audience and their reactions. This means that during the lecture the lecturer must pay attention to follow two groups and not only one group. He must "look into the camera" and give the impression of

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following the group in the remote location. This attention facing the "remote students" gives the lecturer a possibility to follow intensively whether there is a marking with a request for questions or signals in another way with desires for explanations in greater detail of some parts of the material gone over by the lecturer.

It might sound banal, men it is actually something which demands considerable getting used to it or learning when experienced lecturers from traditional auditoriums or seminar rooms have to take possession of the competence to perform facing two groups of students at the same time. It demands the lecturer's permanent attention to how he gesticulates, focuses and moves - in the literal sense of the word that he does not move out of the camera angle.

Successful implementation for the use of videoconference in real-time courses needs interaction with the students so they become active and act in practical use of the equipment and learn to act in these "screen environments". Being able to do this demands pedagogical innovation.

At the same time the pedagogical innovation demands of the lecturer that he structures his presentation in such a way that it compels student reactions in form of answers to questions or by asking directly about the attitude to one or the other of the two groups following the lecture in the conference.

A special impressive way of engaging the students during the lecture is to ask them to solve tasks with a character making the answer to the task suitable for presentation in the conference by giving a short introduction or speak to the other students. The task can be to present the answer to the task directly or to discuss a question academically and theoretically and thus let the student show that he/she has understood the material and can use the acquired theory in a reasonable and adequate way.

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Today's students are very prepared for using modern information and communication technologies and they become very quickly experienced mastering technical and behavioural aspects of interacting with these screen-environments. Normally students are quicker to learn than the average lecturer.

6.4 Student supervisors as video-experts

In order to perform these video conferences it has turned out to be necessary to engage assistant teachers to help the lecturers arrange the equipment, make sound tests and arrange cameras and screens for the wanted form of performance of the course and with the optimal placing of these and belonging microphones.

It was expected that the lecturers could handle these things by themselves, but it turned out that it was necessary to educate assistant teachers among the students to help the individual lecturer to arrange camera and screen and to operate the video conference equipment. Not all the research educated lecturers were interested in learning how to operate the equipment. Added to this is that the student assistant teachers in question are continuously able to help the lecturer to adjust the sound and the camera, focusing and picture angle. The object of this assistant teacher effort is that the arrangement of the equipment is all the time optimized to the situation.

The contribution from this student assistant from technology familiar students is that the lecturer can focus on his own presentation, performance and professional dialogue and has not to occupy himself with the many technical elements in the administration of the comprising conference equipment.

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7. FACILIITES

7.1 The equipment in the lecture theatre – first version
At the start of the first class in 2007 facilities for accomplishment and administration of video conferences were arranged – in three of the university's auditoriums - one in each of the three campuses. This first generation of equipment was based on IP standards and used the national infrastructure for exchange of research data – the Research network – to accomplish the video conferences. This broadband network made it possible together with the purchased equipment to transmit pictures and sound in a satisfactory HD (High Density TV) – quality level.

The installation bought in 2007 was a Polycom model with two camera columns each with two screens were mounted in each of the prepared rooms. The camera columns are mobile and thus the room can be fitted up in a very flexible way.

Today these rooms can be used as auditoriums, seminar rooms for workshops, holding of video meetings and communication of messages from one to a large audience. Both rooms are also fitted with smart boards with Internet connections, keyboards and loose/fixed microphones and a possibility to record and save the camera signals from one location to the ther as standard digital video files.

The price of fitting up each of these three rooms with two navigable cameras and four mobile screens and other infrastructure is around 100,000 $.

Because of good experience with the equipment and because the demand of video communication is massively increasing, ten of such auditoriums/seminar rooms have today been fitted up around the campus of Aalborg University in the different complexes of buildings.

7.2 The equipment in the lecture theatre – second version
At the chartered surveyor education it was necessary to fit up several video conference rooms in the same building. The next generation of video conference equipment was chosen at a lower quality level. A system Life Seize with only one camera on a mobile column and a screen, however, with software based technology for two camera views – close and remote camera – in the same screen.

The video conference room with the Life Seize software for videoconference does not have the same quality and has only one camera and screen for every room. This limited quality sets a barrier to the flexibility and communication.

Experience has shown that this equipment has the same functionality as the PolyCom equipment concerning sound and picture quality. However, the consequence of only one camera in the set up is that a spontaneous debate between the audiences from two locations is more difficult. Experience has also shown that the Life Seize equipment is not as flexible as the PolyCom equipment concerning use for meetings and other communication activity.

The missing flexibility is, however, compensated by the fact that the lecturer finds the equipment considerably easier to use. The number of options regarding the planned use is rather limited, and this increases the user satisfaction.

8. SPIN-OFF ACTIVITES

8.1 Students media literacy strengthening
The first group of students has now almost three years experience of using the video conference system for accomplishment of the course lessons. They have both learnt to use the systems and have also made themselves familiar with behaviour, performance at the course conferences. We have observed that now they behave as used to the media and can handle presentation of difficult material from the course tasks in a conference. Their general skills are now so excellent that they can accomplish the technical backup at the same time as the presentation is accomplished without loss of the quality in the presentation.

In this way the students obtain an important media training and elevate competence to handle digital communication in a broad-spectred technological environment. This acquisition of general and modern communication abilities are considered to be a positive side-effect of this teaching method, and it strengthens the students' general ICT (information and communication technologies) competences.

8.2 Meeting activities between campuses

Another side-effect of this new communication form for holding of course conferences between several campuses has been that video conferences now are widely used at the university for different and multiform communication tasks between the university's employees and persons or organizations in a considerable distance from the main campus of Aalborg University in Aalborg.

Using videoconference for cross-campus communication – like meetings, small workshops and similar - has been one of the very valuable spin-off effects of the strategy about using videoconferences for real-time-lecturing.

Most experience has been obtained from the meeting activities between the different departments. This experience is good, and it has turned out that in committee connections or in management teams where you are familiar with one another beforehand and with a community of values about the objective of the communication, video conferences become an excellent streamlining tool for communication and meetings.

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FIG President Stig Enemark delivering his opening speech from a distance by using Video Conferencing (FIG Workshop Sharing Good Practices, Enschede, the Netherlands, June 2008). In the front Liza Groenendijk, editor of this publication.

Above a "clip" (illustration) from the FIG-Publication No. 46, published for the FIG-2010 Congress.

Using the videoconferences for distance-opening of a workshop was tested in June 2008. President of FIG, Prof. Stig Enemark – physically present at Aalborg University - used the infrastructure to give his opening speech to the audience at ITC-Entschede. Two minutes after the speech was finished, the speech was available on the YouTube Mobile Channel.

Another spectacular example of a possibility of use which grew out of the environment was the use of the video conference room when opening a conference. En local professor from Aalborg University was to open a conference about e-learning in Holland, but he had problems to get there in time. Therefore a study was constructed in great haste in one of the rooms with a video conference system. As the above picture shows they succeeded with

small, but efficient means in creating a study like situation applicable for the task. The camera which communicated the presentation to another location was programmed to shoot it, and the media file from this shooting was then uploaded to YouTube Mobile, and a mail was sent to the audience at the opening in Delft that they could see the speech again via their mobile phone by activating a transmitted URL address.

9. LESSONS LEARNED AND RECOMMANDATION

These first years using video conferences for holding synchronous courses between different campuses have given us a lot of experience which can be used in the coming years to develop the university and readjust it to an even more extensive use of the picture media for communication and learning.

Firstly readjustment takes time. It demands resources and will for middle-aged university lecturers to readjust and develop their pedagogics and competences to operate modern digital media equipment. During the further implementation it is therefore necessary to accept a certain expenditure of time also for lecturers where the motivation absolutely is developed beforehand. We must give space for dissimilarity and diversity both concerning learning style as well as adaptability.

Secondly it was necessary to use students as assistant teachers. Besides being motivated to this pedagogical development, they were also considerably better qualified than the ageing teaching staff to handle these new media at the same time as they took an active part in the communication and learning. At the time being a learning network is being established between these student supporters across locations and year groups.

Finally thirdly capacity building in resource centres across educations, schools and faculties is necessary. It is highly conspicuous that only very few resources are used for the technological and pedagogical readjustment within the university environment, and therefore it is necessary to gather focus and strengths among the fireballs who grow out of the decentralized environments and schools. Without such competence centres it is impossible to accomplish such a readjustment and development which has taken place at the chartered surveyor education in Denmark.

10. COMING TECHNOLOGIES AND PERSPECTIVES
10.1 Next step - streaming videos
The next step in using the picture media in the learning environment will be to start a systematic commissioning of the technology for streamed videos as known from YouTube. This technology is very impressive in a perspective of development, and it also holds a considerable effective reproductive potential which is fortunate to develop. A considerable part of the university's teaching lies within basic surveying which can be streamlined through repetitions.

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10.2 1-2 years
In a 1-2 years perspective it is obvious that within areas as textbooks we will meet an exclusive development of commissioning of e-books and a corresponding spreading of digital journals. This development will be forced by the latest communication technologies and infrastructures such as Ipads, Kindles, etc.

10.3 3-5 years
It is obvious that the development will continue. In a 3-5 years perspective there is every reason to expect that the classic display will disappear and the user interface between human being and machine will be gesticulated computing and communication with pictures and pattern and recognition of location.

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REFERENCES

Enemark, S. (1997): The Role of the Universities in Provision of Continuing Professional Development. AUSM Journal on Land Information Systems, Vol.57, no 3, pp 194-197.

Enemark, S. and Prendergast, P. (2001): Enhancing professional Competence of Surveyors in Europe. FIG and CLGE. FIG Office, Copenhagen.

Enemark, S. (2002): International Trends in Surveying Education. Proceedings of FIG Commission 2, The XXII FIG International Congress, Washington.

Haggren, Henrik and Sorensen, Esben Munk (2000): Virtual Academy - methods and techniques. Proceedings of the FIG Working Week, Prague, May 2000.

Kjersdam, F. and Enemark, S. (1994): The Aalborg Experiment - Project Innovation in University Education. Aalborg University Press.

Sorensen, Esben Munk (2001): Vision for Universities - A 5-10 Year Perspective. Proceedings. FIG Working Week 2001, Seoul, Korea, May 2001.

Sorensen, Esben Munk (1999): On the roads to Virtual Universities. Proceedings of the FIG Working Week, Sun City, South Africa, 1999.

Sorensen, Esben Munk (1998): Applications of Distance Learning and Virtual Universities in Management of Geographic Information. Proceedings of FIG Commission 2, The XXI International FIG Congress, Brighton, UK.

Enemark, S. and Sorensen, Esben Munk (2002): Learning Lab Geomatics- Virtual academy: reengineering university concepts. The XXII International FIG Congress, Washington. USA.

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BIOGRAPHICAL NOTES:

Esben Munk Sørensen is a chartered surveyor, PhD and has been full professor at Aalborg University, Denmark since 2003. He has done research within rural development and spatial planning and within spatial data infrastructure and 3D-modelling. He has published more than 100 articles and book chapters within these subjects. He has former been associate professor at Aalborg University (88-96) and research professor at Danish Research for Forest and Landscape (97-03). He has been editor-in chief for the Danish Journal for Mapping and Landuse from 1988-2003 and from 2010 in same position for a new electronic peer reviewed version of the same journal. Esben Munk Sørensen is very experienced and used supervisor for master and PhD-students within Land Management and Geoinformation Science.

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