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Applying ICT for technology transfer in order to achieve a sustainable system in higher education

**Project report from Linköping University to the Swedish Program for ICT in
developing regions, "SPIDER".**

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LiU and the SPIDER-Link programme

In November, 2004, The Swedish Program for ICT in Developing Regions (SPIDER) granted Linköping University a project for collaboration with its partner universities in developing countries, University of Ouagadougou in Burkina Faso, Red Sea University in Sudan and University of Transport and Communications in Vietnam. Both these grants aim to support the formation and dissemination of knowledge and competence in the area of information and communication technologies in developing countries. The objectives of both these projects are to enable these countries to meet the challenges of deploying ICT resources in such a way that they are sustainable and contribute to the economic development, the efficiency of universities and the quality of life of their people.

The present report constitutes the report concerning the SPIDER ICT Project funding, i. e. the activities that have been carried out at the three partner universities. A separate report constitutes the report concerning the SPIDER ICT Research funding, i. e. the activities which have been executed at Linköping University. It must, however, be underscored that both of these two activities should be seen as one and the same project only.

Linköping University has since many years a very wide experience in several disciplines of relevance to the SPIDER-Link programme.

The Department of Science and Technology at Linköping University has since 1998 carried out a number of very successful higher education programmes in developing countries. Thus, the department was the lead agent in the RetsNet internet-based e-learning programme on improving traffic safety in five southern African countries, Botswana, Malawi, South Africa, Zimbabwe and Namibia.

In 2003 the Department of Science and Technology started another e-learning programme for promoting traffic safety in the 10 countries in South-East Asia (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Singapore, Thailand, The Philippines and Viet Nam) which compose the Association of South-East Asian Nations. Some of these countries like especially Indonesia and the Philippines are spread far apart on thousands of islands while others like Myanmar, Thailand and Viet Nam are very elongated with very mountainous terrain separating the different regions of each country. Use of E-learning therefore constitutes a very forceful instrument for these governments to try to keep the countries together. A Virtual Education Platform for meetings of all participants in these 10 countries was created as well as Virtual Education Platforms (VEP) for each of these countries. Staff of all government agencies within each country concerned with traffic safety at central government level as well as at the various regional levels was gathered during 2004 for training in using VEPs for communication between the different agencies. These training sessions equally included nongovernmental private agencies, which are concerned with combating road accidents in the respective countries. Finally training and coordination at inter-country level within the ASEAN was carried out at two regional seminars.

At Linköping University the Department of Technology and Natural Sciences now develops a new tool to assist the Internet based virtual educational activities. This tool is called Globesafe. Globesafe is an Internet based educational tool, which collects and analyzes country wise

transportation, environmental and socio-economic data. It presents important indicators for analyzing different situations in a country. In the initial phase Globesafe is mainly focusing on the traffic safety problem. Such indicators describe traffic risk as number of persons killed per vehicle, motorization measured as number of vehicles per person, and personal risk as number of persons killed per person etc. Globesafe also contains methods that can calculate and analyze so called Performance Indicators (“soft data”) that can be used as a diagnostic tool when comparing a specific situation in different countries.

There has been a continuous co-operation since 1997 between Sweden and Russia within the fields of traffic Environment and Road safety. This co-operation has been successful over a number of years. The next step is to find cost-efficient ways to build a sustainable technology transfer, which also makes it possible to transfer the knowledge to all the different Russian regions. Through modern ICT-based methods and technology new conditions have been opened in the possibilities to communicate. Still there are two main problems to overcome:

- Language barriers
- Organisation and management of the international and national technology transfer

The Transport University in Moscow called MADI has set up a virtual resource centre for communication and technology transfer with/from Linköping University, Department of Technology and Natural Sciences, Campus Norrköping. These universities will co-operate on the international level, where Linköping can support MADI in different ways within the traffic safety field.

The main objective of such a co-operation will be to create an ICT- centre for traffic safety and traffic environment analysis and implementation. This centre will also serve as a knowledge database that can be used by Russian safety experts and trainers. The centre will be equipped in such a way that it will be able to function also as a virtual centre for technological transfer and communication between Russia and Sweden.

This virtual centre shall be fully equipped for Internet use – with servers etc – for implementation of

- distance education programmes at doctoral and Master-level
- distance education programmes for professional organisations (ministries, agencies etc)
- exchange of teachers and trainers to set up a sustainable system
- exchange of courses, seminars and research projects

Other activities in developing countries

At Linköping university GIS laboratory, IDA, there are several projects in developing countries like in Sudan, where we are cooperating with Doctors without borders, UN organisations and domestic research institutes. In the Middle East (Gaza strip) we have developed ITC/GIS supported models for protection of the drinking water resources. In India the HEALTH project (Health care, policy and management: Evaluating developmental Activities and its Linkages with The Health systems) with participants from The Energy and Resources Institute, Goa, Centre for Development Studies (CDS) Kerala/ India, Indira Gandhi Institute of Development Research (IGIDR) Maharastra/ India is dealing with the use of GIS to improve Health provision services to the population. Together with several Chinese

universities we have project proposals on how to develop the ICT infrastructure for safe and sustainable development.

International Master and PhD-programmes at Linköping university

Linköping University offers a number of international Master-programmes of which some are Internet based. The same goes for PhD-courses. A new international programme will start in January 2006 concerning "Intelligent Transport Systems".

The experiences of these activities and how these could be transferred and implemented with help of ICT and advanced Learning systems (where applicable) were discussed with universities in Burkina Faso, Sudan and Viet Nam as follows:

Spider-Link activities in Burkina Faso

Introduction

University of Ouagadougou (UO) and the Polytechnic University of Bobo-Dioulasso (UPB) in Burkina Faso and Linköping University in Sweden intend to create a research and education project on the general theme « Transport and Development ». This inter-university collaboration constitutes a part of the general cooperation between Burkina Faso and Sweden. The objective is to apply a multidisciplinary approach for the partnership between researchers in the North and in the South.

This research project will in a first phase consist of exploratory research activities related to the themes selected. The results of the research will in a second phase serve the education of the master's students, who come from different backgrounds and experiences. This will be done in a multidisciplinary manner in order to favour the education through research. The teaching method will be distance education. However, the students will be initiated into the Information and Communication Technologies in order to be able to follow the distance education.

Justification

In Ouagadougou, increased demands for improved security in traffic as well as reduction of human, social and economic costs related to traffic accidents are very obvious. Further, there is an increasing awareness of environmental problems, especially atmospheric pollution in the major urban agglomerations. Other factors (events), which contribute to an increased demand for research on transport, are the dynamic evolution of the transport systems, the recent creation of public transport facilities as well as attempts to develop transport policies.

Transport represents the movement of people and goods over a given territory. They are in constant evolution in the industrialised countries as well as in the underdeveloped countries because the evolution of transport depends on demographic factors, economic, environmental etc.

Transport constitutes a large-scale consumer of energy in the form of fuel. They are thus at the origin of oil imports, which influences the evolution of the trade balance.

In addition, the very strong increase in mobility is accompanied by an awakening in the mediums of research, the harmful effects caused by transport on the environment and the quality of life. Motorized transport, by their power consumption, is regarded as one of the principal sources of harmful effects.

Concerning health, transport is related to problems of public health like the AIDS and the traffic accidents. They are presented in the form of an important vector of propagation of the AIDS. Any initiative putting in report/ratio the HIV and Transport must leave the report of the negative impact of the pandemia of the AIDS on the productivity of the transport sector, but also border area and transit at a rate of the importance of the frontier movements people.

HIV programmes exist in Burkina Faso, but specifically do not relate to the border areas and the zones of transit which are the points of passage of important flows people, in particular of the road drivers and other apprentices.

Concerning the traffic accidents, it should be known that they translate the principal dysfunction of the transport system. However, during the last few years, the traffic accidents has become a public health problem at the point where the World Health Organization issued on April 07, 2004 the World Day for the Road Safety.

The present proposal for a research, in its experimental phase, will gather a multi-field team of Teacher-Researchers of the universities of Ouagadougou and Sore. It will be addressed to a limited number of students of level Maîtrise or DESS, which, later, could be re-examined with the rise according to made progress's. They will be the students in Control of Geography and DESS of the Center of Studies for Promotion, the Installation and the Environmental protection (CEPAPE). These students will profit from the formation by research.

This choice of a research burst with transport like transverse topic was made to make it possible to associate academics of different backgrounds.

Objectives of the research and education programme

General objective

Research relating to Transport and the Development has as a general objective on the one hand, to apprehend the role of transport in the problems of public health (propagation of the AIDS and traffic accidents), then on the other hand, to analyze the problems of the natural resources in relation to the question of energy.

Specific objectives

Research is fixed like specific objectives:

- to analyze the role of transport in the propagation of the AIDS;
- to better apprehend the factors and the consequences of the traffic accidents, in relation to the evolution of transport;

- to analyze the impact of the pollution generated by the transport motorized on the health and the environmental pollution;

Conditions of realization of research

The results of this research will be used for the formation, by research, of the students of Maîtrise level and DESS of the universities concerned. This formation by research will be done for the traditional third in présentiel, then, for two thirds, remotely on Internet. Remote teaching will not give right to a particular diploma, but will be used to supplement the training of the students by research in their respective disciplines. Will be concerned the students registered in year of control of Geography and the students registered in DESS in the Center of Studies for Promotion, the Installation and the Environmental protection.

The success of this project requires that the universities establish close relationships to the administrations in charge of transport, the environment and health as with the private organizations so as to facilitate the integration of the students to the environment in which they live, any thing which could facilitate obtaining an employment to them.

The research topics suggested could in the end interest the countries of the sub-region, which would imply collaboration between the universities of the sub-region, thus creating new markets of formation for the students. University of Linköping will provide teachers specialized on the questions of the environment. University of Ouagadougou has two teachers specialized in Transport, Messrs BAMAS Stanislas and SIRPE Gnderman, respectively geographer and transport economist.

Proposal of research topics

Transport and health: air pollution

The energy balance by sector of Burkina Faso shows that the transport sector is an important consumer of energy (56% of the oil bill), which makes it possible to conclude that the transport sector is responsible for a great part of the air pollution of Ouagadougou. Moreover, it should be noticed that transport has an especially very localised impact upon the quality of the air. This is why the air pollution along the principal arteries of Ouagadougou is mainly caused by transport.

An analysis of the registered automobile park of the town of Ouagadougou shows that the age of the majority of the vehicles is higher than 10 years with an average of approximately 14 years. In addition to the vehicles with 4 wheels, a considerable number of 2 wheels circulate in Ouagadougou. The pollution caused by exhaust fumes and their transformation in the atmosphere involves a broad range of problems of health that goes from the cardio-respiratory diseases of which chronic bronchitis, emphysema and asthma with the intoxications by metals, among them lead. It should be noted that the children are most affected by the acute respiratory infections.

According to results' of a thesis of doctorate in progress, the air of Ouagadougou is much more polluted than is the air of Dar-are -Salaam and Gaborone.

The topic of air pollution thus deserves to be approached by laying down the following objectives:

- to sensitize the decision makers and the populations with the problems of the air pollution generated by motorized transport;
- to identify measurements technical, institutional and regulatory likely to limit the pollution generated by motorized transport.

Transport and propagation of the HIV

Transport constitutes an important vector of propagation of the HIV: the road drivers and their auxiliaries attend various partners on the road axes, which they make us of. This type of behavior is likely to propagate the HIV between the women and the lorry drivers.

Transport and road insecurity

The traffic accidents translate everywhere in the world the principal dysfunction of the systems of transport. Road insecurity has since many years become a question of public health.

The exploratory analyses showed that the road accidents in Burkina Faso cause many victims. The rate of accidents with casualties very high is compared with the data of the industrialized countries. The high number of victims per accident explains this high rate.

From the point of view of the characterization of the accidents, one can retain that road RN 4 (road of Fada) is the road having the greatest number of accidents with 21% of all the accidents indexed in the database between 1995 and 1999. Road RN 1 (road of Bobo- Dioulasso) follows very near with 20% of the accidents. On the whole, 90% of the accidents indexed in the database of the accidents occur on the roads categorized like main roads.

In the town of Ouagadougou, the number of accidents noted by the police force passed from 1.141 in 1980 to 1 947 in 1990, then to 2 358 in 1995. The accidents reached the figure of 3 201 in 1998, and then 3 692 in 1999. In year 2000 they were 4058, then fell to 3 630 in 2001. Last year (2002), the police force noted 3 983 accidents in the town of Ouagadougou.

During the last decade, it is an average of 2900 accidents, which the police force noted each year. Let us note that these figures are underestimated for the good reason that the accidents noted by the road prevention brigade of the gendarmerie and implying soldiers and paramilitary are not entered in our data.

Natural resources and their exploitation by the populations

The natural resources (for example water resources, grounds, the vegetable cover, forests etc) are factors that influence the localization of the human activities:

more water available per capita = more human activities = price lower than elsewhere

less water available per capita = less human activities = price higher than elsewhere

Natural resources and renewable energy

The exploitation of renewable natural resources for the needs for energy by the populations

accelerates deforestation and turns the land into desert.

The vast majority of the populations in Burkina Faso, as in much of the countries of Africa, do not have the means of exploiting the techniques of advanced renewable energies. However, the simple techniques are not very expensive. They can make it possible for especially poorest of the population to reach for example the solar furnaces or cookers.

A solar cooker manufactured in Ouagadougou costs approximately 30 000 today F CFA. Already a price reduction of approximately 10 to 20 % could make it much more attractive for a great part of the middle class and the upper lower class of the country, in particular the average civil servant and the actors of the abstract sector.

The research will consist of:

- proposing improvements of the techniques of e.g. solar cooker in order to make them more effective and if possible less expensive (task of the engineers of renewable energy);
- identifying the preferences of the populations concerned (material to be used, forms, colors etc) so that they can more easily accept the use of the cookers;

The results of research should be presented at the authorities (Government, National Assemblée) like at the civil company (ONG etc).

Spider-Link activities in Sudan

Sudan – Environmental monitoring of Coastal Zones – protection of coral reefs in the Red Sea.

Summary of Visit to Port Sudan and the Red Sea University, Sudan

Sudan – Environmental monitoring of Coastal Zones – protection of coral reefs in the Red Sea.

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Using Geo- ICT methods to Protect Coral Reefs at Red Sea

Introduction

The Red Sea is a gulf or basin of the Indian Ocean between Africa and Asia. The connection to the ocean is in the south through the Bab el Mandeb sound and the Gulf of Aden. In the north are the Sinai Peninsula, the Gulf of Aqaba and the Gulf of Suez (leading to the Suez Canal). The sea is roughly 1900 km long and at its widest is over 300 km. The sea floor has a maximum depth of 2,500 m in the central median trench and an average depth of 500 m, but it also has extensive shallow shelves, noted for their marine life and corals. The sea has a surface area of roughly 438,000 or 450,000 km². The sea is the habitat of over 1000 invertebrate species and 200 soft and hard corals. The sea occupies a part of the Great Rift Valley. Red sea bordered by Egypt, Jordan, Saudi Arabia, Sudan, Ethiopia, Yemen and Djibouti.

Coral reefs are the “big cities” of the sea. One-fourth of all known marine species live in reefs, including of fish and thousands of kinds of plants and microorganisms. Reefs are critically important to our planet's ecosystem. Since the late 1970s, reefs across the world have been dying at an unprecedented rate, and it only seems to be getting worse. The Global

Coral Reef Monitoring Network (**GCRMN**), the single largest coral reef monitoring effort in the world, reported in October 2000 at the 9th International Coral Reef Symposium in Bali, Indonesia, that of all the reefs they monitor worldwide, 27 percent have been lost and another 32 percent could be lost in the next 20-30 years. Another report published by the World Resources Institute states that 58 percent of all reefs are at serious risk from **human unsustainable development**. All of these reports point to human activity as the primary reason for the decline of the reefs. Six percent of all the world's reefs are found in the Red Sea, and while these particular reefs look well, 60% of the reefs in the area are thought to be in risk. The danger of pollution is always present in the Red Sea, particularly from oil spillage, and a Royal Decree forbids the discharge of any pollutant substances. At the last ten years new harbour ports were constructed along Sudan coastline this also lead to removal of coral reefs as a part of civil work at the harbour.

Background

When ocean water temperature rises, stony corals expel their zooxanthellae, symbiotic algae that provide nutrients to their host. The corals turn white and die, a phenomenon called "**bleaching**." Today, the Indian Ocean floor is a graveyard of white corals, and the Pacific Ocean's corals are suffering as well. Reefs are damaged by cyclones and tropical storms, disease and, especially, by human activities. Some specialists believe that corals will not survive to the end of the century. However, Red Sea is very far removed from such a status. It is a nearly enclosed body of water and its coastline has comparatively few human inhabitants. So, are the coral reefs of the Red Sea safe? Intense shipping traffic (especially oil tankers) and the development of tourist activities are causes for concern, and pose a very real threat to these underwater treasures. The only solution is to integrate all potentially destructive human activities into a sustainable and secure development plan.

Over the past 50 years, humans have put an enormous amount of pressure on coral reef environments by altering their waters and tearing up their foundations. From dynamite fishing to global warming, the destruction of the reefs has proven to be as frustrating as it is heartbreaking.

Because reef habitats are so complex and because worldwide reef monitoring and mapping efforts only began a little over a decade ago, marine scientists simply do not have enough information to keep tabs on the destruction of the reefs, let alone come up with an effective solution. At the rate the reefs are disappearing, they may be beyond repair by the time a comprehensive plan to save reefs can be put into place.

Geo- ICT approach:

Marine applications of Geographic Information and Communication Technology is an important way to manage large amounts of data produced during surveys or through remote sensing. GIS is increasingly being used to evaluate and monitor coral reef systems worldwide and many of the techniques developed elsewhere can be applied and verified to the ecosystem in the Red Sea. In developing countries and/or in very remote places that may not have the technological infrastructure to house data about local reefs Geo-ICT will play an effective role in forming policies and development of requirements for an Information and Communication Technological Infrastructure that support also spatial data and Information for sustainable development and protection of ecosystems .

GIS-Lab capabilities

GIS-lab at IDA Linköping University has been working in this technological area since 1983. Several of the applications concern sustainable development of land and water and verified models have been developed to predict the nutrient losses from agriculture and other land use. In projects related to the GIS-lab are among other things developed a NGIS (a navigational GIS) that includes an under water Geographical Information System designed to calculate the topography and mix sensor data as from a sonar with digital sea charts. The resulting analyses show areas suitable for navigation but together with models for recommended routes it is possible to calculate no-go areas as to protect the coral reefs. The development also includes remote sensing data as to show the surface and monitor changes in water quality, currents etc. By combining this system with transponder and radar information it is possible to build a monitoring system for protection of the most valuable reefs. We have the expertise to assist in building mobile and marine GIS facilitating the communication of monitoring data to decision makers and environmentalists. We further are working in the area of information provision to decision support systems for rescue services – a functionality important to build in a system for monitoring and conservation. The GIS lab is a founding member of the Association for Geographical Information Laboratories in Europe AGILE, of the European GMOSS network of excellence and the head of the group Dr Åke Sivertun is representing Sweden between 2004-2008 in “the Executive Committee of the International Geographical Union Commission on Geographical Information Science.

Cousteau Society: Environmental protection.

Founded in 1974 by Captain Jacques-Yves Cousteau, The Cousteau Society is dedicated to the preservation of Nature for future generations. It believes that a public that is well informed and aware is able to make better choices for the preservation of nature.

The Cousteau Society receives no governmental funding. It depends completely on the generosity of supporters to help their efforts to explore and protect the precious resources of the planet. No ship sails on expedition around the world, alongside the corals, whales and all the forms of life that populate the ocean.

Our approach

A partial solution to this problem can be done with the Geo-ICT approach. Mapping under sea and introducing remote sensing will help to arise the warning and potential efforts to protect sea inhabitants and reefs. Detailed images of the sea can be collected by satellite imagery and other high-resolution remote sensing satellites. These types of image were originally used to observe land-based change; as well they can produce detailed images of shallow waters around the sea's margins. Producing and processing these images will help marine scientists to understand the situations. Also GI technology approach to map reefs in a fraction of the time it takes to map them by boat or airplane as traditional methods used by marine biologists. With capabilities and experience at GIS-Lab researchers it will be possible to have a **comprehensive map of the Red Sea's reefs within limited time for specific area**. This map would not only be useful for identifying large-scale threats to the reefs, but would allow the researchers to locate those reefs that are in the most trouble.

Our approach will be to support the university and Cousteau Society to create a course module of handling of a GIS-system with a Geo-ICT approach which will be able to analyse and evaluate the future development of the coral reef.

Needs for reefs monitoring methods

Despite the black picture that these reports paint, there is still quite a lot of debate among the scientific community as to how bad the problem really is and what should be done to solve it. That there is simply not enough long-term data on reefs to come to a judgment about their future or what exactly is causing them to die.

Another problem is that scientists working at Red Sea do not have long-term data for reefs. No one knows for certain how much of what appears to be marine environment destruction of coral reef habitats is a result of natural, long-term cycles and how much is caused by human expansion and development of harbour industry.

A more comprehensive method to monitor the reefs would have to be put into place. Ideally such a system would allow scientists to assess individual reefs, observe different trends affecting reefs, such as global warming and pollution, and maintain a consistent historical record and design early warning systems for the reefs at the Red Sea.

Advantages of Geo-ICT approach

- Include field measures in a common “geographical/hydrographical ” database
- High-resolution map would provide an accurate resource for anyone wanting to study or monitor reefs. These maps will help to assess the health of the Red Sea’s reefs on a number of different levels.
- Satellite maps would provide scientists with a way to monitor large-scale potential threats to the reefs. The reef map, for instance, could be compared to worldwide sea surface temperature maps to determine which reefs are most likely to be bleached by global warming.
- It also provides a baseline to prioritize acquisition of very high resolution (few meters) images, such as those provided by **IKONOS**.
- The satellite map could also be employed to observe long-term trends in reef mortality.
- Facilitate analyses and simulations
- Facilitate communication of the problems to other scientists, to decision makers and the public.

Spider-Link activities in Viet Nam

Viet Nam Support for Distance education between the two campuses of Hanoi Transport University. Summary of the visit to

Background on the high education system in Vietnam

The credit system is slowly introduced to some universities in VNM (not UCT) where students have the flexibility to learn more than one subject or taking other classes in other universities. The system is used now at UCT is long-cycle program where all students stay together over the required degree curriculum and years. Students have to pass all courses to move to the next year. The full program degree and curriculum is mandatory. There are two semesters and by end of each semester there is exams period and students have other attempts if they failed.

Each semester has full schedule of courses (same schedule for all students like school) with some hours/ week (weights) for each course, which will be considered when they will do the final exams.

For the Master's degree is awarded at UCT following two and half years of courses work and thesis. For the doctoral degrees at UCT, it is minimum 3 years and usually it takes four years and they said even more. It is possible for doctoral students to collaborate with some other research institutes.

Also there are some open universities in Hanoi and Ho Chi Minh City (not good reputation) and some other semi-private universities owned partly from state. Also there is the Royal Melbourne Institute of Technology (RMIT) in Ho Chi Minh City and its Branch in Hanoi.

Our approach and achievements

On Monday 14th February 2005 and over three days, we (Dr Åke Sivertun and Eng Ghazwan Al Haji from Linköping University/ LiU) made a visit to the University of Communication and Transportation (UCT) in Hanoi/ Viet Nam. The university is of similar size as LiU in the number of students (approx 21000 students) with five faculties in technology, information technology, mechanical engineering, electronic engineering, civil engineering and transport. The UCT was founded on November 15th, 1945 and it will celebrate its 60th anniversary this year. They have another campus in Ho Chi Minh City with approximately 6000 students (full time and part time education). Especially in the relation with the HCM City Campus there was an expressed interest in sharing the experiences from LiU and Sweden in eLearning and distance education. However the internet connections were not really good and the library resources are under developed. In the area of library the university got a World Bank fund on 1.5 million US\$ to establish also a digital catalogue. The development of this and the internet together with the experiences from the digital library at LiU could be another area of capacity building established in between our two universities under the framework of SPIDER and SIDA.

When it comes to joint ventures in the area of curriculum, development of joint masters and PhD courses and perhaps sandwich courses the area of Geoinformatics and Traffic Environment and Safety are natural bases for development as these courses are in the research frontier internationally and where distance and eLearning courses are already developed and have been successfully performed also in Asian countries.

These courses can be provided as courses from LiU with local guidance and tuition in Hanoi and HCM City.

Our impression of the UCT was positive though we arrived only one day after the Tet festivals and most of the students were absent for holidays. However, the teachers assembled and we were able to hold a seminar with approximately 50 participants where we showed some examples on our research in both the field of transport environment and safety and other relevant applications of GIS and the experiences from our distance and eLearning programs. This seminar was greatly received and resulted in some general and individual discussions about possible fields of cooperation.

We were also guided in the computer rooms and got some general information about the number of computers and other facilities the students were able to access free of charge. We visited a Cad lab with approximately 20 work stations and quite good printers and other

equipment. All these equipment were connected in intranet – but of a slow and old fashioned type and capacity. There were also some Internet cafés on the Campus where students were accessing the internet.

The staff had two computers with access to internet at every floor in the office building which is of course difficult to cope up with the standards in developing countries. The number of faculty members are nearly 700 staff where 120 have a Doctoral exam, 180 have a Master degree, more than 300 are graduated as civil Engineers and nearby 150 are under postgraduated.

Full Professors are 41 and the number of doctoral students 57. The number of technical and administrative staff is 250.

During the visit, a Letter of Intent for establishing a scholarly exchange and cooperation between UCT and LiU has been signed from both sides.

Prof Dao was nominated by the Hanoi UCT Rector to be as the coordinator between both UCT and LiU universities. The project Director from LiU Sweden will be Professor Kenneth Asp in collaboration with Dr. Åke Sivertun from the IDA/GIS-Lab.

ICT-related activities and advantages were not fully introduced at UCT upon our visit, where we tried to give different examples on what kind of changes ICT is bringing to the university curriculum, administration, research, library, distance education, post-graduated support, etc. However, we found out that UCT board is very supportive for the development of ICT at university.

In UCT there are few percentage of students can afford their own computers at home where they are obliged to access to computers and to the Internet at the university computer labs during school hours or at the Internet cafes either at university or in the city (network developed for commercial use).

Additional information about UCT can be viewed on the University website:

<http://www.uct.edu.vn/>

During the visit there was some discussion on the STE-net project (opportunities and obstacles) and how we can benefit from, which STE-net project was sponsored by Sida from Sweden in years 2000 to set up an Internet infrastructure and services for Science, Research and Education in Viet Nam. The Viet Nameese Ministry of Science and Technology (MoST) was the main counterpart and implementing organization. More information on the link:

<http://www.dsv.su.se/research/sida/stenet.shtml>

<http://www.most.gov.vn/stenet/aboutus.htm>

Areas of interest regarding ICT applications

Briefly among the areas of interest between UCT and LiU been discussed during the visit regarding ICT application and scientific researching are:

- A network within the university itself
- A network between UCT Hanoi Campus and UCT Ho Chi Minh City Campus
- A library electronic information and search system
- A sandwich program which means that MSc and PhD students can take part of the studies at home and part abroad in Sweden..
- UCT university is also planning to build new high-performance Campus north of Hanoi and they are searching for external funds, support and experience. In this purpose, UCT has invited LiU for any possible support (e.g. ICT projects) before going in more details.
- Cooperation on Road Safety and GIS distance education at Master and research levels
- Training to the technicians and ICT experts at UCT..

- Developing ICT Centre at university,
- Developing ICT curriculum at university.
- Research cooperating on the project involving transport, environment, traffic safety and management.

Introducing ICT in the UCT University is changing the way of education culture and more efforts should be done here. E-learning is seen to be as one of the main focus.

Our suggestion is that UTC will be included in our application for development money regarding the ICT in DC program with support from SIDA. This will also give us the opportunity to find funding for arranging sandwich courses with exchange of staff and students in between our two Universities and other Swedish Universities involved in the SPIDER project.

If this is not successful the capacity of the UTC and the shown will and enthusiasm to cooperate with LiU could result in a solely bilateral agreement with similar content as the pretended SPIDER application. Our suggestion is therefore that we investigate also other sources for funding through other SIDA and other initiatives as to facilitate these achievements.