

## **E-LEARNING EXPERIENCES AND SUSTAINABILITY: A PILOTING OF DISTANCE M.Sc. THESIS SUPERVISION AT ITC, THE NETHERLANDS**

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### **ABSTRACT:**

In most of the developing countries the blackboard and chalks are quite common teaching materials to deliver the knowledge to the students. Students cannot think about virtual learning techniques. Teaching means teacher should be physically presented front of students with chalk and duster and delivered their lectures to the students. But now, the use of computer technology and ICT tools are making possible for virtual learning. The concept of distance learning is emerging in each of the academic institution. Within this distance learning environment, the mode of teaching as well as learning has been shifted from physical to virtual environment. The e-learning has become a part of education system in most of the renowned academic institutions. The physical presence is becoming less significant and the earth is becoming a global village due to web technology and development in ICT.

This paper commences with background and describes the evolution of distance education. It then, illustrates the development of e-learning activities in Geoinformatics subjects of various academic institutions. After that It elaborates the ITC's strategic plan 2005-2009 "From building capacity to the building on capacity" and its focus for distance learning mode. A piloting of distance M.Sc. Thesis supervision and author's own experience about it is explained in the next section which also describes how the piloting was structured and the students were supervised their thesis from Europe to South Asia. A summary of SWOT (Strengths, Weaknesses, Opportunities and Threats) of this distance thesis supervision has outlined. Finally, the paper provides some guidelines and recommendations for distance thesis supervision through ICT tools for the success of the study.

## **1. INTRODUCTION**

### **1.1 Motivation**

I was born in a remote village of Nepal and had started my primary education with local chalk and wooden slate (pati). I was extremely glad when my father gave me a bamboo pen and local ink for writing in a local paper (pahadi kagaj). We used kerosene oil (tuki) and some times special fire woods (diyalo) to study in night. In my childhood my dream was once in my life to go to Kathmandu to see King's village as it took more than 3-4 days to reach in capital city from my village in those times. But, now days, we are living in King's village (Kathmandu). In dream also, I was never thought that I would be graduated from European Institution. But, now, due to the advancement of technology and infrastructure, I stayed in my house and completed my M.Sc. Degree from ITC, The Netherlands with securing good marks. It's just like a miracle comparing to my childhood times. Now days, the physical presence is becoming less significant and the earth is becoming a global village due to web technology and development in ICT tools.

### **1.2 Background**

In most of the developing countries, the blackboard and chalk are the common teaching materials in a classroom. Students cannot think about the virtual learning environment. Teaching means the teacher should be physically presented front of students with chalk and duster and delivered the lectures to the

students. But now due to the advancement of technology, the mode of teaching has changed from physical learning to virtual learning environment. In most of the universities and colleges some sort of distance learning scheme has developed. In developed countries, the e-learning is becoming very popular under this distance learning model. Thus, the concept of a 'virtual university' has been internationally accepted as a viable educational model. Like other renowned academic institution, ITC has embraced these virtual academic developments and adopted different tools (ranging from blackboard learning system to distance thesis supervision) in its distance learning platform. It has changed the mode of teaching from traditional hierarchical educational structure to a more flexible, open, networked configuration educational structure. A team is actively involving in ITC to explore new innovative ideas to deliver and share its knowledge to it's partner institutions. ITC was getting request from the students to do research works in the subjects related to local circumstances from distance. As a piloting, ITC has provided the opportunity for two students from GIM having different background and infrastructure to do their M.Sc. thesis work from distance. The author himself was getting this opportunity. This paper explained the evolution of distance education and the author's own experience on it in details and provide some guidelines for success of distance thesis supervision.

### **1.3 Evolution of Distance Education**

Taylor (1999) has developed a schema and divided the distance education phases into five models. According to his schema,

the first model is 'correspondence model' based solely on print technology; the second model is the 'multimedia model' based on print, audio and video technologies; the third is the 'tele-learning model' based on the application of telecommunications technologies and the fourth, is the 'flexible learning model' based on on-line delivery via internet. The fifth model is "intelligent flexible learning model" that will enable a quantum leap in economies of scale and cost effectiveness beginning to emerge. It will use automated response systems that scan the text of incoming e-mail and respond intelligently without human intervention. The fourth model based on ICT is becoming very popular and on the practice. The development of interactive broadband communication technology is providing a new opportunity for sharing, learning and broadcasting academic events. Shea-Schultz and Fogarty (2003) explored that e-learning solutions could cater to the learner by facilitating the delivery of the right information and skills to the right people at the right time. It is now possible to study a variety of subjects, ranging from Business Management to Marine technology ([www.cvu.strath.ac.uk](http://www.cvu.strath.ac.uk), 2003), without ever entering a classroom. The Geo-Informatics subject is also not the exceptional in this regards. There are varieties of courses ranges from short course to full graduate level courses developed by universities in this Geoinformatics subject. The following paragraphs describe the various modules of Geoinformatics subject developed under this flexible learning model from different universities of this world.

#### 1.4 E-learning in Geoinformatics

The e-learning is an innovation for teaching and learning through ICT tools. Nowadays it is becoming a very important node of distance education. The concept of distance learning is emerging in each of the academic institution. Within this distance learning environment, the mode of teaching as well as learning has been shifted from physical to virtual environment. The e-learning has become a part of education system in most of the renowned academic institutions. Like other subjects, the Geoinformatics subject is also touched with this innovation. Basically, in the e-learning procedure under Geoinformatics subject the knowledge has been delivered to its clients in two ways: individually and in a network. UNIGIS ([www.unugis.net](http://www.unugis.net)) and USDLA ([www.usdla.org](http://www.usdla.org)) are the examples of networking programme supported by an international network of qualified academia and professionals. There are various courses ranges from short courses to graduate level courses which are specially designed to satisfy the local needs under this scheme. Tutoring and assessment is done by mail, phone and email. Students use digital and online study materials. In most of the cases, the assessment is done through coursework. Likewise, individually also some universities are attempting to deliver their knowledge through e-learning. A literature review has done to understand how the e-learning scheme has been structured and implemented according to the user's need. The following section describes the mode of e-learning scheme of some academic institutions.

##### Leeds Metropolitan University

School of the Built Environment under Leeds Metropolitan University has four post graduate level courses that are delivered by distance learning scheme. They are Civil Engineering Commercial Management, Quantity Surveying

Commercial Management, Building Surveying and Facilities Management. Students can complete the courses without attending the University. The course materials could deliver to the students through CD's/videos and web technology. They have developed unitized distance learning framework (Rodgers, D. and C. Garbett, 2003). This is an innovative approach to break subject theme into a small unit and deliver the knowledge.

##### Dublin Institute of technology

The Department of Geomatics, in the Faculty of the Built Environment in Dublin Institute of Technology (DIT), provides a four-year full-time degree course in Geomatics. Besides this, it also recruits the staffs of National Mapping Organization (Ordnance Survey of Ireland i.e. OSi) as a tool of Continuous Professional Development (OPD). An agreement was made between DIT and OSi to train a group of fifteen staff members of OSi and the theme of the course was 'Co-ordinate Reference Systems for Spatial Information'. The piloting was started in January 2002 and was successfully completed. The second pilot course was conducted to train twenty two personnel and completed in April 2003. They have used WebCT® e-learning platform (Martin, A., K. Mooney, et al., 2003). From this piloting this type of e-learning is found an appropriate and potentially effective medium for the CPD and skills upgrading of personnel of National Mapping Organization where the staffs are very busy to their professional works and scattered all over the country.

##### University of West Hungary

There are various distance learning courses designed at University of West Hungary, College of Geoinformatics to deliver the knowledge to the students. The NODE (Networked Open Distance Education) MINERVA project was one which was launched to deliver the knowledge to the individual learner through distributed networks. According to its clients desire a three-tiered system containing authors, educational gateways ('brokers') and points-of-learning has been envisaged, with the latter institutions serving as interfaces with individual learners (Markus, B., 2003).

##### University of the South Pacific

The University of the South Pacific (USP) is a truly regional university, serving twelve member nations (Cook Islands, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu). USP is by its nature offering hundreds of its courses by distance and flexible learning (DFL) modes. The key to the USP Virtual Academy is USPNet which was established in 1974 to provide a communications system between main campus in Suva with the other USP campuses in Samoa and Vanuatu. Now the USPNet has modernised with VSAT telecommunications network and connected with USP member campuses. USPNet provides the opportunity to participate in audio tutorials, (conducted from any campus), communicate by e-mail with a lecturer/tutor or another student; access the World Wide Web, watch a live video broadcast of a lecture from any of the three campuses and take part in video conferences (and tutoring) with the Laucala Campus in Suva. Also, university administration has used this USPNet to communicate with other USP locations (Boydell, S. and B. Curley, 2005). The use of video conferencing saves time and money of university administration to meet the people.

## University of Stuttgart (IAGB)

In university of Stuttgart, The e-learning project gimolus (GIS- und modellgestützte Lernmodule für umweltorientierte Studiengänge) is a learning module for GIS and modelling in environmental courses which is designed to create a internet based e-learning platform for GIS study. It was started at the Institute for Applications of Geodesy to Engineering (IAGB). Together with the Institute for Photogrammetry (IFP) at University Stuttgart, the basics of GIS for the environmental disciplines involved into the project were treated. The following environmental university institutes and groups were integrated into the project (Schwieger, V. and T. Kaufmann, 2005).

1. Institute for landscape-planning and ecology (ILPÖ) – University Stuttgart
2. Institute of Hydraulic Engineering – University Stuttgart
3. Landscape Ecology Working Group – University of Oldenburg
4. Field Station Fabrikschleichach - University of Würzburg

Besides it, the University Stuttgart is engaged in the field of e-learning. The projects launched by the rectorate are named as 100-online and self-study-online.

## 2. DISTANCE LEARNING AT ITC

### 2.1 ITC strategic plan for distance learning

Since its establishment (in 1950), ITC has accommodated dynamic behaviour to the development in its knowledge field, and developments in its knowledge policies according to the need of its client. It has revised its strategic plan every four years. The new strategic plan 2005-2009 is the continuation of previous strategic plan 2001-2004 with some modifications according to its clients need. The new strategic plan starts with the theme “building capacity to building on capacity” and partnership with qualified education and training organizations in ITC’s target countries for the transfer of knowledge and expertise in geo-information science and earth observation. The leading theme is building partnerships that will deliver joint education programme building a network of partnership. The distance education is one of the approaches to deliver knowledge to its partner institution. Distance education powered by e-learning is one of the agenda of this strategic plan. This e-learning scheme was developed according to the need of its client student as they were unwilling to be away from their work and family and need European degree (ITC, 2005). Hence ITC has explored an innovative approach to deliver the knowledge and satisfying its clients utilizing modern ICT tools. ITC offers several short courses and components of degree courses through e-learning scheme under distance education. The following are the courses offered by ITC in 2005-2006 in its distance education mode.

### 2.2 Distance short courses

The following are the distance short courses a combination of part time self study and extensive online support by ITC staff. Several other courses are on being developed. Each short course is based on a module in one of ITC’s degree or short

courses (www.itc.nl). The duration of each of the course is equivalent to the duration of ITC’s module courses.

1. Principles of Geographic Information Systems
2. Quality of Geospatial Data and Related Statistical Concepts
3. Environmental Impact Assessment
4. Spatial Decision Support Systems
5. Principles of Remote Sensing

### 2.3 MSc research at a distance

ITC offers the opportunity for non NFP fellowship MSc students who have studied the first twelve months of the MSc course at ITC’s premises in Enschede, The Netherlands to undertake their research and write the thesis in their home country with supervision provided at a distance. Participants in the M.Sc courses will stay five months period in the home country with supervision provided at a distance and one month at ITC. This offer was granted to the participants after the piloting for distance supervision. To qualify for MSc research at a distance the participant should full fill the criteria/conditions set by ITC course management.

### 2.4 Other distance learning course at ITC

#### Master of Science course in Geographical Information Management and Applications (GIMA)

This two-year course is offered by ITC, Delft University of Technology, Utrecht University, and Wageningen University and Research Centre. The course is mainly distance learning in combination with one ten-day face-to-face workshop per semester in the Netherlands.

#### EuroSDR EduServ4

EduServ is the education service of European Spatial Data Research and the services are offered with strong input from ITC. It consists of the following four two-week distance eLearning courses.

1. Quality of Geospatial Data and the Related Statistical Concepts
2. Co-ordinate systems and transformations for spatial position
3. Positional Accuracy Improvement in GI databases
4. Methods for checking and improving DTMs

## 3. EXPERIENCE AND EVALUATION

### 3.1 Experience of Distance Thesis Supervision

Most of my senior level officers were graduated from ITC, so I have chosen ITC for my graduate degree. Initially, I was admitted for the Professional Master’s (PM) Degree Programme in Geoinformation Management (GIM3) at ITC, the Netherlands through Netherlands Fellowship Programme (NFP). The PM Degree does not have research component. On the way of my study, my interest changed towards the research degree. One of the reasons to change my interest was the possibility of research degree to open the door for further study and I could enhance my research skills to solve various issues in my professional works. Hence I approached to Program Director (PD) M.C. (Kees) Bronsveld of GIM programme. He was agreed for my study extension to Master of Science Degree in Geoinformation Management (GIM2 Programme). But there

was problem of funding for another six months more. Due to the new policy of NUFFIC, the fellowship could not be extended for longer period. Kees (PD) explored the way for my interest. After the discussion with ITC management team, he offered us distance thesis supervision scheme as a piloting for the same course. I and my friend A.S. Padmavaty from ISRO, India got the chance for our extension to GIM2 programme. Before awarding us the extension we got the consent for extension from PM to M.Sc degree from our home organisation. A contract document was signed after our research proposal was accepted by the Degree Assessment Board (DAB). It was a test case so no tuition fee was charged to us. We stayed 15 more days at ITC for the preparation. We got the financial support from ITC for our fieldworks and later travel cost too. In the agreement it was agreed that we have to work for average of 45 hours per week on the thesis. We made a time table for our six month period and approved from supervisors and before leaving ITC for thesis work.

In the contract document it was agreed that we have to send our progress report in every two weeks. We strictly follow the agreement. I met my supervisors through e-mail and chat (yahoo and msn) to discuss about research theme. If I sent an e-mail to my supervisors they would answer me within three days and the same was followed from my side too. The GIM secretary Laura was always online and she was the clearinghouse to bridge the contact with ITC personnel through internet. Theoretically, I spent one month period for field work and five month period for thesis work but in practice I was near the research area so I went to the research area whenever it was needed. The mid term presentation was done using telephone line. The presentation slides were already sent to the ITC. After presentation, I got feed back and valuable remarks from supervisors and professors.

I also got the chance for MSc day presentation as I was qualified as one of the four students of GIM for that presentation. The MSc day is organised in the context of best M.Sc thesis award every year (Teuben, J., 2005). Those students who have presented their work at M.Sc day would only be qualified for best thesis award at ITC. The M.Sc day was memorable and exciting event for me as I was delivering my presentation from Nepal and my audiences were in the auditorium hall of ITC, The Netherlands. The presentation was made live broadcasting through internet. Two telephone lines were used for presentation; one for presentation and another for internet connection. A web camera was connected and MSN Messenger was used for chatting. After my presentation, whole day I observed other presentation through internet. In this way, I engaged myself fully for each and every activities of ITC as an ITC regular student from distance. I finished my research work on the scheduled time and submitted through e-mail attachment. I returned to ITC to defend thesis and completed successfully my M.Sc degree with distinction. The pilot was very successful, both from ITC perspective and student perspective. ITC was very satisfied with the level of the produced theses. The possibility to do the thesis at a distance is now a regular product of ITC.



Photograph 1: In M.Sc. Day Mr. Paudyal is delivering his remote presentation from Nepal to his audience at ITC.



Photograph 2: Mr. Paudyal is receiving his M.Sc. Degree from his supervisor Ir. Water de Vries



Photograph 3: Mr. Paudyal is enjoying with Prof. Dr. Martien Molenaar, Rector (right) and Prof. Dr. Menno-Jan Kraak, chair of DAB (left) after graduation.

### 3.2 Evaluation of distance thesis supervision

For evaluation of this distance thesis supervision, SWOT method is used. The following paragraphs give the strengths, weaknesses, opportunities and threats of the distance thesis supervision programme. The views are purely from the author's own experience and report from ITC news (ten Dam, I., 2005).

#### Strengths of distance thesis supervision

- Not being far from family members (not the problem of being homesick) and more concentration on the research work
- Fewer funds necessary for study (living, insurance, food etc.)
- Not wastage of time for cooking, shopping, washing etc
- Not wastage of time for fieldwork preparation and returning from fieldwork
- Good food and weather for research works
- Being near to the research area (local circumstances) the research output could be tested with the local experts whenever it is needed
- Chances of very good research output from study
- Chances of research output implementation in home organisation to solve the problem

#### Weaknesses of distance thesis supervision

- Less access of library and resources
- For solving the technical problems the transaction cost will be very high
- Disturbance from family members and friends
- Feeling of isolation for the study
- Cannot benchmark the progress
- Cannot share the ideas with fellow students
- More time should be devoted than at university
- Less chances to discuss/meet with relevant professors
- Not the chances of attending research seminars and less aware for research activities

#### Opportunities of distance thesis supervision

- Advancement of ICT and GIS (development of cable internet and optical fibre) and the internet cost is affordable
- The Bologna declaration for higher education in Europe (standardization and networking)
- Powerful virtual digital library in web (like OICRF, ITC library, etc.)
- Dynamic supervisors at university (prefer digital learning)
- Skilled managerial manpower and ICT people in university
- Motivation of students towards research degree
- Could access intranet and web mail from distance
- Recognition of e-learning in strategic plan
- The concept of virtual learning is emerging
- Local supervisors/experts are interested to guide and available
- Availability of necessary HW/SW and other research materials in the local market at affordable cost
- The home organisations are ready to support the candidate and local university are ready for the partnership

- Provision of ftp and local website for big data sharing from distance
- Availability of funds (travel fund) from home organisation for data collection

#### Threats of distance thesis supervision

- Deficiency of personnel (at university) who can understand the local circumstances of research area
- Lack of defined research methodology for distance thesis supervision (probably the action research methodology may be more relevant for distance thesis supervision)
- Load shading and limited electric back
- Limited internet connection
- For solving the technical problem, the transaction cost is very high
- Students may not aware about the research topics when they have selected it
- Lack of recognition of degree awarded from distance education (local people are not much aware about virtual learning)
- Inconvenient data access from distance due to security/firewall policy
- Work load for female candidate both from domestic as well as office side (in South Asia)

## 4. GUIDELINES AND RECOMMENDATIONS

From my own experience and evaluation through SWOT, the following guidelines and recommendations are suggested for the sustainability of distance M.Sc thesis supervision.

1. The student should have very good academic performance in the research related modules and his research proposal should have approved by the Degree Assessment Board (DAB)
2. The written and spoken English language of the student should be very good
3. The student should have sufficient work experience and the research topics should be related to his professional work; finalized consultation with his home organization
4. The Organization should be ready to provide access of necessary data resources at their local office and if necessary to provide the full leave or 50% time to work for his thesis at their office.
5. The participants should be very serious and has a proven ability to work independently. Also he should have the value for his study.
6. The communication infrastructure of students' home country should be very good.
7. The institution should have made available the local website or blackboard environment to share the data and literatures to the student. There should be the provision of easily intranet access from distance.
8. Video-conferencing would be more effective for remote presentation and discussion. It is affordable in local market.
9. Access of library materials should be made from distance and provision for long term loan of library materials should be made.

10. There is a need to make both of supervisors equally responsible/ devoted (The contribution should be made the same) to support the student.
11. It takes more time to discuss through chatting. More time should be devoted by the supervisors.
12. The supervisor should have the knowledge of local situation of home country of the participant.
13. There should be a one person always ready to make available to bridge students with Program Director, Supervisors and other staffs.
14. The student should allow spending the first one month of the thesis period at the Institution for preparation and the last one month for compilation of documents and come back defend the thesis at the institute. There is a need to test whether the candidate can defence their thesis from distance.
15. There is a need to develop chatting language (code and catchy words) for chatting. It will shave the time at the time of chatting.
16. The student should aware about the progress and problems of regular fellow students.
17. It is necessary to explore the appropriate research methodology for distance thesis supervision ( the topics not much technical side may be action research is appropriate)
18. Some cost should be shared by the student such that he can understand the value of his study.
19. The provision of local supervisor is good; good understanding between local supervisor, main supervisors and student. Local supervisor should have qualification, in-depth knowledge and research interest.
20. Still there is a need to test this scheme in another geographical location like Africa.

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