Future Education – FIG Commission 2 Perspectives

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SUMMARY

Professional education and training will have a crucial role in developing of the capabilities for the networking society as well as educating the people who will use them. The networked world is changing the way we create products and provide services. Continuous education and training has become an important issue in the rapidly evolving new information society. A fundamental transformation continues to occur in higher education. Industry needs education and training programmes that are flexible, tailor made and cost effective. Students or trainees are also changing. In the rapidly-changing world, land administration must offer all employees greater opportunities for access to knowledge, irrespective of their age or social circumstances. The following problems were identified in the United Nations Meetings of Officials in Land Administration (UN MOLA) Workshop on Land Market in 1998 in Budapest: lack of education in the management, legal, economic, human and ethical aspects of land administration; general lack of user oriented approach to education; lack of continuity in education from universities to professions and appropriate linkage between the two. The first part of the presentation is dealing with the educational and training needs.

The second part of the presentation highlights the most important trends in educational methods and infrastructure, deals with issues of eLearning, networked education, educational metadata, knowledge management and problem based learning and project based learning.

The surveying profession has facing the facts of the loss of many surveying and geomatics educational programs in the last decades. The methods and technologies mentioned in Chapter 2 are available to accomplish the successful future educational and training programmes: we have online content delivery systems, many existing successful surveying courses, a significant knowledge and experiences of professionals, and professional associations and companies to provide the local mentors. The concluding part of the presentation is painting the possible future perspectives of the work in FIG Commission 2.

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1. NEEDS

Due to advances in digitisation, processing speed, storage and communications, we are living in a networking revolution. Professional education and training will have a crucial role in developing these capabilities as well as educating the people who will use them. New job opportunities will be created in the processing, organizing, packaging and disseminating of spatial information. The networked world is changing the way we create products and provide services. All around us we find new tailored products, targeted marketing and customisation. Consumer demand for more choice, higher quality, lower cost, better service and convenient access is a dominant force affecting all industries, including higher education (Oblinger – Verville, 1999).

Continuous education and training has become an important issue in the rapidly evolving information society. A fundamental transformation continues to occur in higher education. Information and Communication Technologies (ICT) are having a deep effect on teaching and learning and are eroding traditional geographical boundaries resulting in greater competition and opportunity. Industry needs education and training programmes that are flexible, tailor made and cost effective. Students or trainees are also changing. Part-time, adult learners know that learning is no longer confined to university campuses, and are seeking flexible ways to meet their personal, academic or employment objectives.

In the rapidly-changing world, land administration must offer all employees greater opportunities for access to knowledge, irrespective of their age or social circumstances. The following problems were identified in the United Nations Meetings of Officials in Land Administration (UN MOLA) Workshop on Land Market in 1998 in Budapest: lack of education in the management, legal, economic, human and ethical aspects of land administration; general lack of user oriented approach to education; lack of continuity in education from universities to professions and appropriate linkage between the two. MOLA in the conclusions defined the following facts:

- Training of land management staff aims in technical skills rather than general land management skills.
- The current situation were:
    - the focus on technical matters
    - lack of education in management, legal, economic, human and ethical aspects of land administration
    - general lack of user oriented approach to education
    - lack of continuity in education from universities to professions and appropriate linkage between the two.

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- The consensus on the needs for education and training in the modern environment, with the market economy and with a rapid increase in the use of technology in both the professions and education, was that
  - professionals need a mix of technical, managerial and sociological education with training in transferable skills of communication, problem solving and learning to learn
  - education sector needs to adapt to manage for change and to inculcate this approach in students
  - educational and professional sectors need to be more strongly user oriented
  - education structures and methods need to adapt to new technologies
  - there is a need to address issues of transferability.

The Bathurst Declaration (1999) documented well that increasing public awareness, developing appropriate institutions and advancing their maturity are critical to the achievement of the aims of securing sustainable development, and for the recognition of the role of land in this context. It is recommended that governments be encouraged to re-engineer their land administration systems so that they better serve the needs of all levels in society. The Declaration recommends in view of the crucial importance of human resources in the management of land, *ensure* that there is sustained education and training in land administration.

Prof. Magel (2004) in his opening speech in Athens highlighted the so-called political regulatory framework, which also includes institutional questions. "*Without the lasting establishment of an "institutional landscape" based on good governance principles, i.e. without the establishment of cadastres and land registers in transitional, post-conflict or transformation countries, the aid provided by the international community in the field of land reform will remain to a large extent ineffective. Without the assurance of a functioning and corruption free administration and public service, many supporting measures in e.g. Urban and Rural Development will remain ineffective; without the establishment of an ethically oriented private economy there will be no lasting success. Added to this must also be a change of mind in the scale of values, i.e. it must be generally recognised that achievement must be worth while. Achievement involves also the creation and recognition of elites and corresponding educational institutions.*"

2. EDUCATIONAL INFRASTRUCTURE

2.1 eLearning

eLearning, Information Communication Technologies (ICT) supported learning, virtual learning, web based learning - the computers and networking are new opportunities in teaching and their use is increasing rapidly. There are many options to the use of ICT in learning. They can be used as administrative tools (enrolment, registers), for logistics (announcements, material), for searching the information, for communication and guidance and for many other things (E4, 2001). The extent of using ICT in teaching and learning varies also from the use of computer as a tool in one of the things mentioned above to a infrastructure where a whole learning process supported by Inter-/Extranets. ICT can enable

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many things that are very difficult to bring to the learning process otherwise. Computer animations and simulations often make a difficult theoretical thing to "alive" in very different manner. Certain use of ICT also enables student participation, which is not tied to a time or place and makes it easier to bring multinational and multicultural groups together. It can also enhance a better use of resources. Generally the obstacles towards the use of it can be divided to on the one hand to attitudinal and practical and on the other to pedagogical, technical and social. When talking about eLearning it is important to mention some aspect of equality. We refer here to both economical and cultural equality. Equality between countries: In this aspect eLearning would prohibit equality, because third world countries would have a problem with the transition from one system to the other, mostly because current infrastructures are very poor. Still between European countries the gap could be increased. There is a need here for governmental investments. Inside the country could be a problem the differences in information infrastructure between rural and urban areas. eLearning is not supposed to apply at first globally. A positive aspect, that information can be theoretically accessible to a wider range of people all over the world, therefore cultural equality is in this way promoted, but we go back again to the economical inequality, because not everybody could have the physical access to that information.

2.2 Networked Education

Networked learning refers to situation where students from more than one institution are brought together to study the same course or module. Networked educational institutions can benefit from each others core competence areas and other assets. It will improve the use of resources. The students experience a multicultural studying environment. Networked institutions are not only universities but also other institutions or industrial partners.

Since eLearning removes many barriers of traditional hierarchical educational structure, institutions are transforming into a more flexible, open, networked configuration. The nodes can take many forms. Some nodes have worked well with a tight focus on practical delivery issues, while others have been set up to consider wider development concerns. Their main purpose is to provide a space in which innovation can grow. They should be very flexible changing as necessary. There are two basic types of nodes: gateway and point-of-learning. While the gateway is an active knowledge engine, the point-of-learning is a knowledge transmitter, educational or training provider. However their role and function is changing dynamically. They usually involve people meeting and working together within agencies and across public organisations to solve common problems which are perceived to exist by those who are delivering the educational or training service. Geographically laid out, the knowledge is spread in a network, which has many access points. Like a map can be read from any point, the knowledge within networked environment can be collected from many sources. The knowledge space has also a temporal dimension. The knowledge space is in dynamic changes.

The networking aspect of the nodes can be a major strength not only across members but also within organisations. Nodes keep a focus on service delivery and users' concerns. The process of working in a member organisation can be as important as the outcomes. Staff understanding of the decision-making process improves and they can become more

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committed to the outcomes. They can help to generate culture change. Changing the culture of an organisation cannot be accomplished by edict from the top. Nodes provide experience for staff of how to take the initiative and propose change. It provides a model for introducing a dynamic process of change.

A distributed learning environment is a learner-centred approach to distance education, which integrates a number of technologies to enable activities and interaction between students and tutors. Our model is based on amalgamating appropriate technologies with aspects of local learning centre-based workshops and co-operative Internet-based distance education. This approach gives tutors the flexibility to meet the needs of diverse student populations, while providing both high quality and cost-effective learning.

2.3 Metadata

Educational metadata should provide the minimum requirements to define the attributes required to fully/adequately describe the educational objects. The reason for creating metadata, from the provider perspective, is to improve the possibilities of retrieval as well as to support control and management of learning objects. As the volume of digital learning resources increase keeping track of, and identifying resources which is often maintained by different organisations becomes increasingly difficult. A cross domain method of describing learning resources is required. Metadata will help potential learners 'discover' what information is available and will help them assess the suitability of that data for a given task. Distance learning materials and services with their abundance of different formats and control measures might not always be usable directly by everyone: the format might be unfamiliar or unreadable, the content might be encrypted, otherwise prohibited or only permitted after payment, the resource might be large, difficult or time consuming to access etc. In all those cases, metadata could support the learning process.

There are three main levels of metadata. Collection level metadata provides the user with a quick look at the data. The user will be able to gain an overview of the contents and scope of the data set. Collection level metadata forms are often fairly short. They can be filled out easily by hand. Data set level metadata is more detailed than collection level. It provides a fuller picture of what a data set will contain, describing the types of features encoded and possibly the lineage (history) of the data set. Data set level metadata formats are typically verbose, running to several pages of printed text and can be boring and laborious to complete. Feature level descriptions provide very detailed descriptions of a data set. Such detailed records are used to describe the behaviour of individual objects in a data set. This description is required to allow the objects themselves to be transferred and manipulated in an open networked environment. The metadata model and metadata creation tool must also be user friendly.

2.4 Project / Problem Based Learning

Project / Problem Based Learning: Both methods differ a lot from the traditional lecture based education and they may require quite a lot of adaptation from the teachers and the students. Project based learning is probably the more widely used and is applied often by

teachers. In project based learning the focus is in learning to apply knowledge that has been introduced to the students beforehand. The emphasis is often in working methods and in project management which students learn on the side of their work. Project based learning is usually rather time consuming and the results of the project are reported and often also highly valued in assessment. The work is done in teams and the whole team is responsible for the outcomes.

Problem based learning on the other hand is a process where students search and analyse information and construct their own understanding about the problem. The first analysis of the problem scenario is done in groups but the searching and analysing the knowledge is often individual process. The findings are then brought together and discussed. The results are usually not assessed but emphasis is put on the process of inquiry. Each student is responsible for his/her own inquiry and learning outcomes.

2.5 Knowledge Management

Learning technology is rapidly changing. In previous years we focussed on Content Management (CM): content creation, electronic publication, Internet-based communication and student support, taking into account the special pedagogy of distance education. However, we realized the need to move from CM to Knowledge Management (KM). The differences between CM and KM are in the business components, including strategy, processes, and organization.

By using a Knowledge Management System (KMS), organisations increase returns, save time and money, are more adaptable, and have a far better understanding of partners, processes, customers, competitors and their business. To benefit from every customer or partner interaction, corporations must give employees opportunities to record what was learned. Efficient knowledge management needs not only document knowledge but must provide tools for collaboration to all contributors to the knowledge pool. Then, other employees must have access to the data and the means to understand it in context. Knowledge management helps an organisation gain insight and understanding from its own experiences. When employees use this KMS, best practices are stored throughout the organization, and each employee accessing the system has similar power to the best employee (ArsDigita, 2001).

2.6 Tasks

Education is critical to the social and economic development of a people, a nation, and a profession. Surveying is hopefully becoming an elite, high tech profession - the "geo niche" of information technology. At the same time surveying profession has facing the facts of the loss of many university surveying and geomatics programs in the last decades. In terms of enrolment, surveying programs are small compared to other disciplines, and in the traditional way comparatively expensive to operate. Hopes that the shortfalls will be turned around without changing our attitudes now seem optimistic. We are at the crossroads; the above mentioned methods and technologies are needed to accomplish the successful future educational and training programmes: we have online content delivery systems, the existing

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surveying courses, a significant knowledge and experiences of professionals, and professional associations and companies to provide the local mentors.

The urgent task for educational institutions is to reorganise resources for professional development services. In extending existing education and training programmes, the main objectives should be:
− to promote open, distance learning, eLearning made possible by new communication technologies ;
− to develop common (meta-)databases and other sources of knowledge on skills needs;
− to improve the interoperability of systems of distance learning and increase the level of standardisation;
− to develop still further the corporate dimension of education;
− to foster innovation in education by improving knowledge management, increasing exchanges of experience and information on good practice;
− to conduct comparative research on methodologies used and policies implemented.

The mission of FIG Commission 2 (Profession Education) to support on the highest level the surveying society within the following main areas
− Methods and content of education: To develop and promote learning and teaching methods and content of curricula with special emphasis on university level, high technology - based education.
− Interaction between academia and practice: To stimulate interaction between university education, research and practice so as continuously to develop educational curricula and enable surveyors to put into practice the results of research and development.
− Academic and professional profiles: Through the promotion of continuing professional development (CPD) and the practical application of research, help surveyors continuously to update their academic and professional profiles.
− Accessible knowledge: To approach surveying education to countries and people with difficulties to access to usual learning methods by new technology (Virtual Academy).
− Educational links: To establish all over the world, but mainly in the third one, liaison groups to facilitate educational joint works, projects, etc.
− Cooperation: Education of surveyors is not only a duty of FIG or Commission 2; strong links of collaboration must be established with the sister organizations and our own Commissions.

The future tasks of Commission 2 includes the following actions
− To perform needs analysis of Commission 2 members and FIG Academic members
− To develop further the FIG Educational database and facilities using educational and internet standards
− To reinforce contacts to Educational Commissions of International Organisations on the related professions (ICA, ISPRS, AGILE, IAG etc.)
− On the field of communication
− To improve dissemination of information on educational theory and practice to the members across the world

- To strengthen knowledge transfer between FIG Commissions, to inspire activities on knowledge networks
- To organize annual seminars on actual topics related to education and training
- On the field of co-operation
- To investigate the use of information and communication technology can support networked professional education, like eLearning, educational platforms and portals etc.
- To endorse international researches in surveying education and training and to initiate joint projects on this field (curriculum development, educational material development, joint MSc courses, quality assurance etc.)
- To organise jointly International / Regional Summer Schools for solving problems, filling educational gaps and for building communities within young professionals

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BIOGRAPHICAL NOTES

Bela Markus is a land surveyor, M.Sc., Ph.D., professor of Geoinformatics, and director of the College of Geoinformatics, University of West Hungary. He has 30 years teaching experience in surveying, 15 years in teaching GIS and 10 years in development and organization of open, distance learning professional courses for land administration. Prof. Markus has over seventy published papers on various aspects of using GIS.

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He is actively involved in many national and international academic programmes, is chairman of the National Committee, Association of Hungarian Surveyors and Cartographers, chairman of the Hungarian UNIGIS Course Board. He is member of Board of Directors of FIG Foundation. From 2002 he is chairing the FIG Working Group 2.4 – Knowledge in Spatial Information Management and the Chair Elect of FIG Commission 2. Prof. Markus is member of AGILE Council and EUROPACE Executive Committee. In 2003-2004 he is advising Central European land Knowledge Center (Budapest, Hungary) as an International Expert on Knowledge Transfer.

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