

# Chapter 1



## Aspects of computer use in learning and teaching Geography in European higher education

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### Introduction

The system of higher education in Europe is undergoing a tremendous transformation as a result of the Bologna Process (Norwegian Ministry of Education and Research, 2005). New courses and programmes are being developed at undergraduate and postgraduate level which will mean that academics are likely to be required to work in many new ways. Student learning is now expected to become the central focus in course restructuring of content, layout and structure (Koller, 2000).

Computer technologies have the potential to transform education by generating innovative learning and teaching situations. Innovations in information and communications technologies (ICT) suggest that there are considerable opportunities to enable much wider access to higher education and the ability to support learners as and when they need it and from any possible location (Swan, 2004). So higher education needs to respond to these new student demands. Specifically it should provide courses and qualifications that suit the rapidly changing job marketplace. There remains however little real consideration or understanding of the relevance and importance of generic (Stubbings and Brine, 2004) and subject-specific (Quality Assurance Agency for Higher Education, 2000) computer skills and competences that should be provided during degree courses. A comparative analysis of the expectations and outcomes of university study has been undertaken through the TUNING Project (Haug, 2001). This has indicated that there are some significant gaps between the perceived needs of employers, compared with the outcomes of graduates and opinions of academics.

Improved access to today's powerful computer networks as well as the development and increasingly widespread use of managed learning environments should promote developments in modern education approaches (McLean and Lynch, 2003). An integrated computer-based approach to providing relevant learning should therefore be matching the powerful changes that are taking place in our information technology orientated society. It appears however that this is far from the case in the teaching and learning of Geography in higher education.

### **eEurope as a Higher Education Agenda**

The Higher Education Area is a key educational goal of the European Union (Conference of European Ministers, 2001). The goal is to become the most competitive and dynamic knowledge base in the world capable of sustainable economic growth with more and better jobs and greater social cohesion through the Lisbon Agenda (European Commission, 2005). This places the onus on higher education to contribute significantly to this aim, partly through the use of new technologies. eEurope is the European action which actively supports and promotes the information society to all in Europe (Commission of the European Communities, 2002). Some of its core educational priorities have been identified as eLearning, eWorking skills and eInclusion (European Commission, 2002). Therefore, the European Commission strongly endorses the use of ICT in education and training in order to bring access to educational opportunities in a more equally distributed fashion throughout an enlarging Europe.

The European Commission provides funding to pilot, test and promote innovative technological solutions and supports and promotes the dissemination of good practise (Donert, 2005). It suggests that there should be much greater emphasis on the types of cooperation and collaboration in learning brought about by communication and information technologies throughout Europe (Reding, 2000). ICT developments for education in Europe have become financially significant. With increasing investment in technology it appears that several major corporate organisations have become stakeholders in the higher education system, without having any significant knowledge of the real needs of education. I believe therefore that a technological-push continues to dominate the higher educational scene (Schumpeter, 1939).

The Bologna process is closely connected with transforming higher education structures as well as educational content. If Bologna provides

common standpoints for all higher education institutions where a relevant curriculum is needed to answer the needs of society, under the proposed new Socrates action European organisations will strive towards establishing a sustainable lifelong learning programme (NIACE, 2003). Higher education institutions in Europe are now expected to actively include information and communication technologies (Moreno and Grande, 2005). If and how they achieve this should be under close scrutiny.

### **e-Learning and the Learning Experience**

eLearning is for many a confusing topic, with no simple definition of what it constitutes. The European eLearning Action Plan seeks to drive technology, training and implementation of eLearning with relevant content, services and suitable environments (Commission of the European Communities, 2001) through support for significant education and training programmes. The eLearning Action Plan describes elearning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. It implies the use of software designed to manage specific aspects of learning which are organised by a tutor (Wolpers, 2004). The elearning software might consist of a core set of features which include the delivery of learning materials, learner administration functions such as progress tracking, assessment of learners, different forms of communication, planning, organisation and timetabling facilities, searching tools and online help (Milligan, 2000). Most current elearning software appears to offer similar sets of solutions, but newer developments, like that associated with the Semantic Web, offer developers of Web-based applications the potential to provide more intelligent access and management functions (Aroya and Dicheva, 2004).

Many elearning applications provide a learning space which gives opportunities for student-centred learning approaches. They thus could offer the potential to achieve this core mission of Bologna. However it is not the environments themselves that support or enhance learning, but instead the ways in which they are used. Simms (2000) maintains that it is as a result of active engagement with learning that elearning can really enhance the student experience. Without professional support and training, how can university academics hope to actively engage learners and improve the learning experience (Singh *et al.*, 2005; Donert, 2004)?

## **Computers and Geography Across a European Network**

In late 2002 HERODOT was established as the European Thematic Network for Geography teachers and lecturers in higher education. It was set up in response to the needs of higher education Geography departments as they sought to implement aspects of the Bologna process. Enormous economic, social, technical and political changes have also been taking place in Europe. The democratisation of Central and Eastern Europe has created an enlarged European social and economic space. So the importance to Europe of a relevant and innovative Geography curriculum has never been so great. So HERODOT established a research and publication programme dealing with many important aspects of Geography in higher education in Europe.

In mid-2003, 65 of the 81 member departments of the HERODOT network responded to an in-depth questionnaire about the state of Geography in their institutions, their work and in their countries. This included a number of questions relating to issues associated with the use of computers and e-learning in teaching and learning (Donert, 2005). This research showed that many departments offered distinct courses in ICT in Geography; however few at this time used either distance learning or elearning to deliver courses for their students. Computing and GIS practical courses were widely taught, usually reflecting the need to provide basic ICT skills for students, rather than specific spatial computing. Often more specialised skills were then provided in more advanced courses (Donert, 2004).

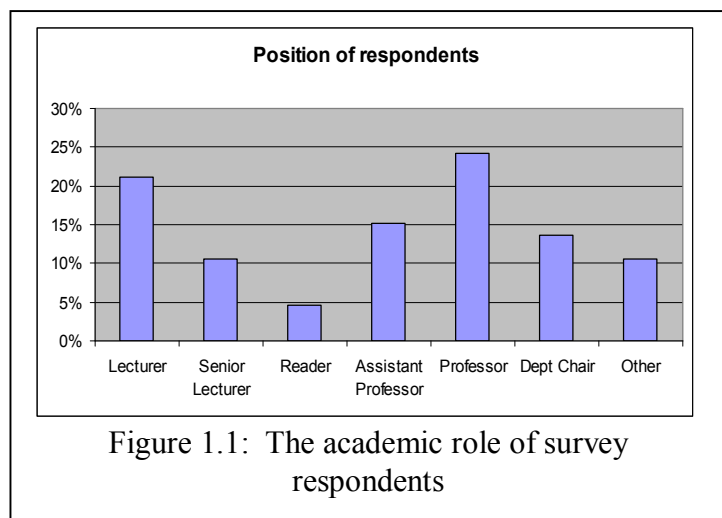
In almost two-thirds of the departments, students were rarely actively encouraged to use computers in support of their learning. So, the obvious benefits offered by information availability, representation possibilities and opportunities for communications through ICT in the learning process were under-represented. The survey demonstrated that computer use was mainly by academics to prepare courses rather than the ICT being integrated into the courses themselves. The main activities were commonly stated as the preparation of better materials, and collecting examples and resources for lectures. Geographers, once at the forefront of computer-assisted and Internet-enhanced learning developments (JISC, undated) seemed therefore to have lost touch with modern student-orientated learning environments. The survey concluded that Geographers teaching in higher education:

- should expect to include ICT as part of promoted learning approaches

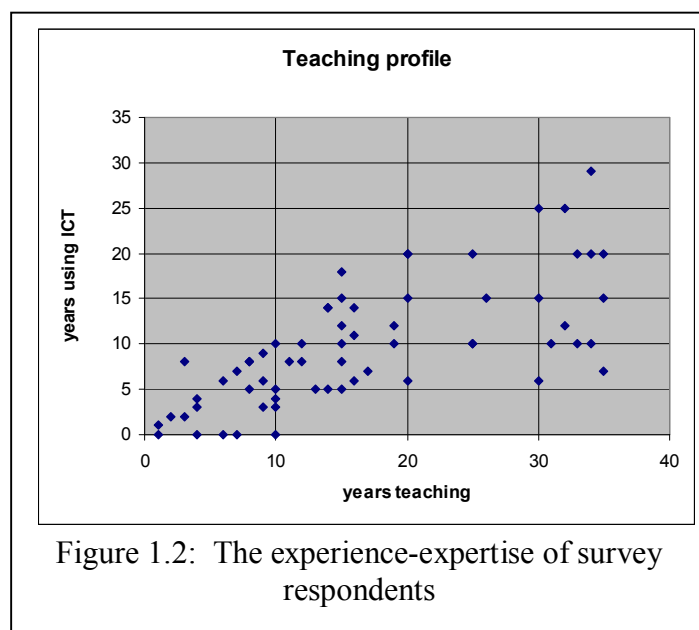
- should consider how e-learning changes the way that higher education Geography learning takes place and
- must consider the potential of new technologies in geographical education
- should undertake research if they are to maximise online pedagogical opportunities in teaching exciting, authentic and relevant Geography in higher education.

In early 2005 a new survey of HERODOT members was undertaken. The aims of this research were to:

- describe the uses of ICT in Geography in higher education in Europe
- analyse the characteristics of ICT use in Geography teaching in higher education
- assess the attitudes and approaches of academics to ICT in Geography
- identify weaknesses and needs and
- make some recommendations for action.



The survey was distributed to the 112 European member Geography departments via email and post. A total of 69 institutions responded from 26 countries. The largest number of national responses was from the UK (10) followed by the Czech Republic (7), Netherlands (6), Estonia and Austria (5). The relative position of the respondents was very varied (Figure 1.1). It demonstrated a very broad teaching profile (Figure 1.2). They were classified in terms of their teaching experience and their use of computers. In the former they were divided into



senior, experienced, established and new and latterly into experts, experiences, established and new.

A sample of 12 respondents with different levels of experience and expertise were then contacted by telephone, where a series of in-depth, qualitative questions were asked. The results from these surveys answer four main questions.

*a) What were higher education Geography teachers using computers for?*

All the Geographers and the Geography departments used computers as a central component of their work. In most cases, computer use remained mainly personal in preparation for teaching and for personal academic research in support of teaching. The academics mainly commented on searching for high quality online resources which they could then use to create or further develop their courses. There was little or no mention of creating student activities or providing learning opportunities. This suggested a highly teacher-orientated approach, rather than the student-

centred learning encouraged by Bologna aspirations. This outcome was reinforced by the fact that only about one-third of those concerned had taught using distance learning and one fifth had run a distance learning course (Figure 1.3). Even fewer had even experienced online collaboration with peers or colleagues. Given the

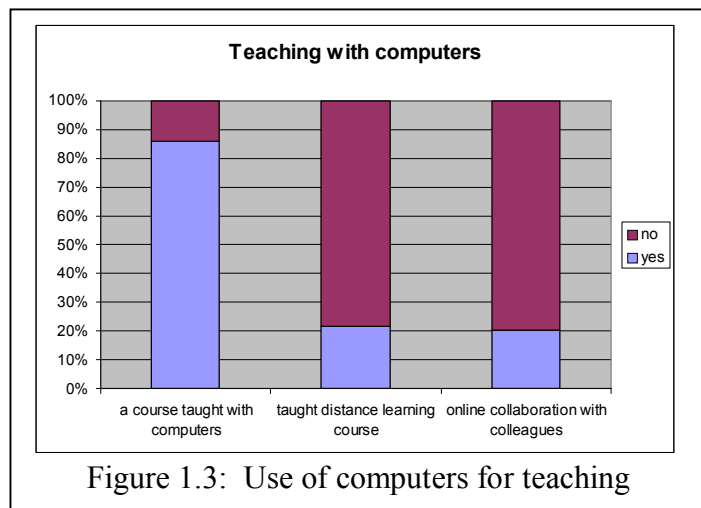


Figure 1.3: Use of computers for teaching

increased bandwidth, improved technology and the plethora of freely available online communications tools this outcome was very surprising. Few Geographers appeared to value anything other than face-to-face collaboration or real-world interaction. So the tools and technologies so readily used by their students were largely being ignored by academics in teaching and learning situations.

*b) What are the perceptions of ICT?*

The research reviewed the perceptions of computer use as a tool for learning. Almost all respondents (94%) confirmed that online courses and computer-based courses should be an important part of the student learning

experience. Computers were generally seen as an indispensable tool needed by Geographers for information gathering (62%) and document preparation (60%), but much less so for presentation (36%) and communication (49%). A surprise however was that few (27%) recognised the potential of computer-based visual learning or that of online interaction (32%). The computer was thus perceived by only 17% as a central teaching tool and by 21% to be a central learning tool. There was therefore clearly a mismatch between the opportunities they acknowledged and their intention to incorporate them.

*c) What understanding did Geographers have of the potential of ICT?*

Most of the replies recognised the main learner benefits that computers brought. Respondents mainly commented on the increased motivation of students and the flexibility provided in time and space. Some even mentioned the fact that computer use provided deeper and broader learning opportunities. A few commented on the potential realised by using computers in creating truly challenging courses, providing exciting learning opportunities and generating high levels of interactivity as outlined by Rich *et al.*

(2001). However, most academics appeared to demonstrate little confidence in attempting to use computers as an integrated learning tool in their courses. This was despite the fact that they said there were few apparent barriers or negative aspects to their computer use.

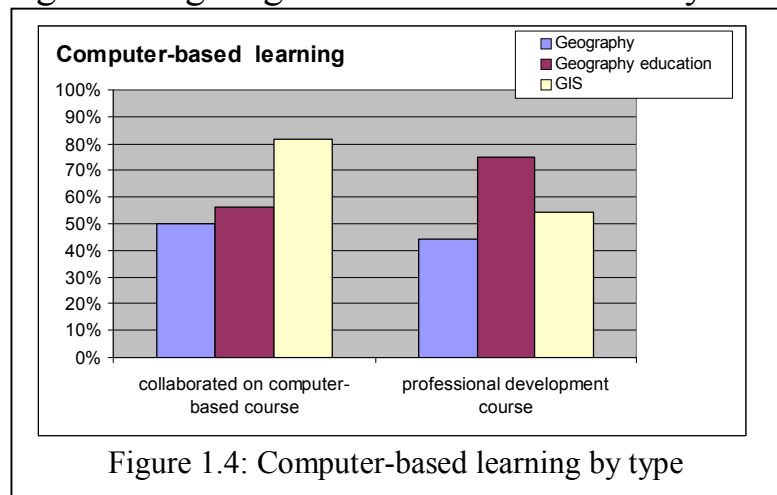


Figure 1.4: Computer-based learning by type

Of considerable concern was the fact that academic Geographers were much less committed to the integrated use of computers in learning and teaching than those who were teaching GIS or in teacher education. It was also the case that academics teaching Geography were less likely to have undertaken professional development to support their use of computers (Figure 4). Far fewer Geographers than the other groups recognised the practical teaching benefits offered by computers, such as the improved management and organisation of courses and classes.

So it was clear that few Geographers had integrated computer use in their teaching process and the student learning process (John and Sutherland, 2004). Therefore it seems that Geography students were not being given many opportunities to experience learning online, despite the fact that many benefits were recognised. As Ongoing training is an important challenge if Geography is to be seen as a profession (Coppock, 1974) much of this is likely to be online in the future (Switzer, 2003). So the question, “Is Geography behind other academic disciplines?” should be asked?

*d) What are the current drivers of change?*

Much innovation and change is taking place in all European higher education. The surveys confirmed that academics believed that students need to work with computers. So the forces of change were perceived to be in the hands of the learners. The Internet and Intranet were said to be essential, but in contrast online pedagogical tools, including those offered by virtual learning environments, were not considered by most to be important. Those surveyed and interviewed were much less aware of or concerned with distance learning aspects like communication opportunities, than of specialist geographical software and data

The higher education institutions themselves were thought to be the other main driver of change. Bologna was cited as a dominant driving force by most academics, except those from the UK and Ireland, where Bachelors/Masters systems have long been in place. Most organisations now required computer use in academic studies by staff and students. Most provided computers and support for staff, but there remained few (if any) rewards for those academics that develop courses which encourage learning with computers. There also commonly appeared to be much less support available for learners than for teachers. If learning is to become increasingly student-centred then providing a suitable level of technical and pedagogical support will be critical (Laurillard, 2001).

So, academic Geographers in Europe mainly appear to be using ICT for low level practical functions rather than integrating computers into learning and teaching Geography. They perceive ICT as being very important to them and to their students. However they have low understanding levels of the true potential of ICT, stating that it is students, rather than themselves who are the main drivers of change.

Managers like Department Heads and Chairs are likely to be a key group influencing change. So their responses (n=15) were of specific interest. Between them they probably managed to identify the potential role that computers should perform in higher education Geography. They also gave a valuable range of examples of computer-enhancements for learning and teaching Geography, which is presented here.

They enthusiastically confirmed that computers provided information access and provision.

“Learners are able to allocate, interpret, arrange data, develop graphs, work with a Web-GIS, simulation and demonstration, work on a whiteboard”

“It is necessary in any kind of spatial geography and scientific questions as well as in education because it is a tool to analyse, visualise, restructure etc. geographical data”

They commented that computers greatly enhanced the teaching of Geography through Geo-information.

“GIS is a tool to enhance the student’s understanding of social and natural phenomena on a local and global scale in a way most students are comfortable with due to their everyday use of computers for applications like gaming and communication etc.”

“In the development of models, in cartography and GIS, for searching journals, papers and access to maps and planning issues”

Aspects of international communication and dealing with global issues were recognised as an important feature.

“Facilitates information search from around the world, analysis of data, the presentation of data (although great danger that Power Point used excessively at the expense of original thought and direct personal contact).”

“Potential for contact across national boundaries could be developed more”

“It allows students to broaden their awareness of ‘big’ issues like global economy and globalization processes”

“Finding information on the web, collecting and evidence of students work, communicating with students (assessment, instructions...)”

“Enables global access to data and collaboration with others”

Interaction and integration were also considered valuable.

“Allows the possibility of elearning”

“More student-tutor interaction”

However there was some scepticism.

“I don’t know. My feeling is that students consult a much wider range of information sources than before, but much more superficially.”

“In presentation terms (oral, written), FORM tends to overrule FUNCTION in the use of computer technologies.”

“Computer communication (mail, discussion groups in webCT, etc) tends to be much more shallow and casual than face to face communication, in my experience.”

### **Some Gaps, Actions and Proposals**

Bologna and eEurope imply that online education will need to be central to the creation of a European Higher Education Area by 2010. The Geography TUNING survey undertaken by HERODOT members in 17 countries shows that Geography academics think that their courses provide adequate information management skills. However European employers and graduate attitudes disagree, they believe that the use of computers is covered rather than information management (Donert, 2006a). Academics, employers and graduates all agree on the high relative importance of both as generic skills for employability and society.

The HERODOT network seeks to provide professional development and support for higher education geographers in Europe. So as a result of the research presented here a number of actions have already been implemented. This HERODOT publication is a review that examines the state of computer use in a number of higher education Geography departments. The contributors were academics who in October 2005 had attended a professional training workshop in the Czech Republic run by the network on “*Computers in Geography*”. This workshop aimed to encourage these Geographers to become more aware of the opportunities to use computers in creating learning environments for their students and the advantages this brings.

It is probable that in many cases subject ‘managers’ are likely to hold the key to encouraging innovation and change (Fisher and Binns, 2000). Their experience, expertise, power and influence mean that they are more likely to be in a position to affect practise, especially when concerning younger and more junior members of staff. So providing opportunities for managers to develop greater awareness of the advantages of computer use would now seem to be important need. Perhaps a series of best practise papers could be produced to provide interactive advice on how to use computers through a Web site that offers advice, guidance and examples (specifically for Geographers). This would certainly help promote the benefits of learning (and teaching) online which could be a showcase for collaborative international projects (Keane, 2005; Solem, 2005) and launch further research.

## **Conclusions and Recommendations**

Geography in European higher education has, along with all other academic areas, been struggling with the changes brought about by Bologna. In many cases it appears to have become enslaved in its own disciplinary curriculum (Mezősi, 2005), seeking to deliver maximum content, while ignoring educational needs that the potential afforded by new technologies can provide. Bologna should not encourage Geographers to simply transfer their old curriculum into a changed format.

Geography has the potential to be the subject that can address many of the important needs of Europe, so the Geography community needs to create learning opportunities and approaches that are relevant to our students. Students increasingly require tailor-made, learner-centred collaborative courses that focus on their individual needs (Livingstone and Lynch,

2000). Geographers must therefore embrace online learning as it provides opportunities for significant levels of student interaction,

Recognising the role and value of computers is essential for geographers as it has been shown to be an excellent facility for the development of critical thinking skills (Reed and Mitchell, 2001), as well as collaborative competences including cooperative problem solving and teamwork activities (Simms, 2000). So integrating elearning within our Geography courses needs to become a high priority, as it would encourage deeper, more reflective and student centred learning approaches (Gerber and Williams, 2000), thus meeting the core goals of Bologna

The significance of a Thematic Network like HERODOT in gathering such information should be under-estimated. Its role is to stimulate, encourage and support change. It is likely that Geography departments across Europe will seek to offer many online courses in the near future, many of them delivered through the medium of English language. It is likely that they will need considerable advice and guidance in pedagogical rather than technological terms. So our mission should be to enable the building of professional communities of academic geography teachers as suggested by Healey (2003).

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## Chapter 2



# Computers and Geography Education in Bulgaria

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### Introduction

In our changing and dynamic world, information and communication technologies (ICT) have an important role in each domain of human activity. Their appropriate utilisation can bring further development of scientific and teaching and learning work by providing us with tools for access, selection and processing of relevant information. ICT can be used effectively in both the arts and the sciences and it makes education more interesting. This chapter gives an information about Bulgarian virtual university and Sofia University Computer Centre. The benefits and problems of using computers in geography education are discussed. Some courses form curriculum of Faculty of Geology and Geography in Sofia University which integrate the use ICT in their activities are introduced.

### **National Program “E-Bulgaria”, the Bulgarian Virtual University**

The National Program “E-Bulgaria” started in May 2004 (E-Bulgaria, 2004). The aim of this program is to achieve the European indices for the development of information society. New framework for ICT policy in Europe is developed by the Commission of the European Communities in e-Europe 2005 Action Plan (Commission of the European Communities, 2004). Five projects were included in the Program “E-Bulgaria”:

- “ESi–Centre” – a project to develop a regional centre of European Software Institute. Bulgaria will become the sixth-largest centre for software technology transfer outside the USA.
- “E-Centre” – to establish a network of public telecommunication centres in the country
- “E–Class” – a project for computerising Bulgarian schools
- “E-University” – a project which supports equipping computer rooms and the establishment of websites for university e-learning

- “E-Net” – project to establish information relationships between Bulgarian universities and scientific institutes as well relation with European researcher networks.

For Bulgarian science and education the most important of these are the projects “E-Class”, “E–University” and “E–Net”. A logical extension of the project “E–Bulgaria” is the national project for the creation of a virtual educational environment. This project involves most of the Bulgarian universities and scientific institutions. In April 2005 Bulgarian academic society decided to establish a Bulgarian Virtual University. In the first stage this university will provide links to regional universities. The intention is to increase its independency and role. The main tasks of the Virtual University are to ensure access to technology and information exchange, to support skills development and establishment of technology opened infrastructure which will be the basis of education (Bulgarian Virtual University, <http://ecet.ecs.ru.acad.bg/bvu/index.php>)

Distance Education offers various advantages to students as:

- a possibility for an individual pace of study;
- a flexible timetable;
- a considerable reduction of expenses;
- a suitable form of education for students who are not able to physically attend the University;
- an interactive form of education at any point in the world in compliance with present world trends.

### **University Computer Centre and Centre for Distance Learning at University of Sofia**

The University Computer Centre (UCC) is one of the independent university units. The Centre provides computer facilities to all faculties of the University. The facilities are available to all undergraduate students, to postgraduates and academic staff, providing IT support for personal research and training courses. The developing University Campus Network (SUnet) improves the University communication infrastructure that links the existing information and computer resources with national and international networks.

The Educational and Research Services offers the following computer training workshops and courses for students, lecturers and staff.

- Writing Java Applets (WJA)-

- Introducing Windows 3.1 (3.11) (Win311)
- Text Processing with MS Word 6.0 (Word6)
- Working with spreadsheets with MS Excel 5.0 (Excel5)
- Working with databases with MS Access 2.0 (Access2)
- Creating presentations with MS PowerPoint 4.0 (Point4)
- Integrated software MS Works 3.0 for text processing, spreadsheets and databases (Works)
- Macintosh basics (MacB)
- Internet services (IS)
- Multimedia with Macromedia Director (MMD)
- Multimedia with Adobe Premiere (MAP)
- Windows95 basics, WindowsNT basics, Word97, Excel97, Powerpoint97

ICT facilities at the university provide a means to be able to have contact with colleagues from all over the world. For example, students in Geography at Sofia University maintain strong contacts with other colleagues, through the European Geography Association (EGEA), a European network of geography students and young geographers, through forums, conferences and other means. There are many discussion boards and student web site that has been established during the years. International partners of UCC are University of Rennes, University of Montpellier and University of Bordeaux (France), UCS Swansea (UK), Saarland University–Rechenzentrum (Germany) and T. E. I. Larissa (Greece). Bulgarian Partners are the Technical University, University of Architecture, Civil Engineering and Geodesy, University of Mining and Geology and University of National and World Economy.

The University of Sofia “Saint Kliment Ohridski” is one of the Bulgarian universities which established the Bulgarian Virtual University in 2005. The constitutive contract has been signed by 37 Bulgarian universities and 26 scientific institutions. The Centre for Distance Learning is based at the University of Sofia. The academic assembly at the University has accepted a series of rules for the organisation and delivery of distance education. The main principles are that:

- distance education is equal to regular and extra-mural education;
- distance education is conducted by the main sections of the University – faculties and departments;

- the Centre for distance education is responsible for methodological guidance, control and assessment;
- Distance education is applicable to all stages of education - Bachelor, Master and Doctor in regard to peculiarities of different subjects.

All departments at Sofia University follow same principles in implementing ICT policy, which is coordinated centrally. Unfortunately additional effort is needed in order to do a better job. The Bulgarian Ministry of Education and Science is the main external initiator of ICT implementation at the university. Various projects have been implemented through the ministry, both for teaching and research purposes.

### **Use of Computers in Geography Education**

The benefits of the use of ICT in education include the development of additional teaching strategies, increased interest in lessons, and time savings. Lamb (1992) described the "classroom of tomorrow" as a multimedia classroom. She stated that the benefits of multimedia-based classroom instruction in higher education are the production of a stimulating teaching and learning environment and the encouragement of student ownership and self-expression in their learning. Multimedia integrates text, graphics, sound, images, animation, and full-motion video with the power of computers to create a "multi-sensory" experience (Oblinger, 1992).

In higher education geography computers could be used as:

- sources of data and information;
- analytical tools;
- laboratories for investigating the world (simulation, modelling, experiments);
- communication tools;
- as instructors.

Database software can be used to store geographic data in an accessible format which can be edited and updated in the future. Numerical data can be applied for statistical analysis. Electronic atlases also are a source of data and can be used as an instructional tool. Atlases introduce students with Geographic Information Systems (GIS) functions and basic cartographic works. A GIS can also serve as a repository for information and various types of data. The student's interest can increase when a teacher gives different kind of tasks during the process of training. GIS

technology is used to analyze and visualize the results. GIS makes it possible to link or integrate information that is difficult through other means. GIS can use combination of mapped variable to build and analyze new variables. The function “visualization” allows producing not just maps, but drawings, animation and other cartographic products. Simulation and modelling are applicable both to physical and human geography topics (global warming, general circulation mechanisms, land and resource use, and pollution). Communication between computers allows for the remote access of data and for collaborative projects.

The benefits of using computers in geography education are undeniable. But there are some problems too. The most common problems presented by technology in the classroom are the expense, accessibility for classroom use, and amount of training required. To solve this problems software companies and GIS community take due measures for improving teacher access to the technology, providing learning opportunities and technical advice for the development of software for the education.

### **Some examples of the use of computers in the Faculty of Geology and Geography, University of Sofia**

The University of Sofia provides bachelors degrees in Geography and Biology and in History and Geography. At the University of Sofia there are four specialties: “Geography”, “Tourism”, “Geology” and “Regional Development and Policy”. A number of their courses have a distinct ICT component and some of these are summarised in this section.

The Bachelors degree program includes an optional course in Informatics which is composed of 30 hours of lectures and 30 hours practical work and gives four ECTS credits. The aim of the course is to provide knowledge about the main concepts and principles of ICT and about the application of ICT in geography. The students learn how to use word processing, database and spreadsheet and have the possibility to communicate with specialists from other Bulgarian and foreign institutes and universities.

The course in Statistics is an optional course in the Bachelors degree program in Tourism. The course is presented by 45 hours of lectures and 15 hours of practical work and gives four ECTS credits. The students gain knowledge and skills in applying statistical methods in demographic and economic research. The course provides information about National

statistical information system and its methodology and organization. The students learn how to use database and SPSS in social investigation.

Most of courses on the Masters degree programmes rely on and integrate the use ICT in their activities. The students improve their skills for applying statistical and analytical methods, spatial analysis, spatial modelling and multimedia in geography education. The leading role in this field has Department of Cartography and GIS. The following specific licensed programs are used for education and research:

- for digitisation and input of spatial data - *MapInfo Professional*
- for spatial analysis and modelling - *ArcView GIS 3.2; ArcGIS 8.3*
- for processing and interpretation of satellite images and their integration in GIS data base - *MicroMSI, PCI Geomatics, ERDAS Imagine*

For visualisation of didactic materials and printing the following technical tools are used: *multimedia projector PHILIPS* , *plotter HP DesignJet 350 C, Printer- Xerox Work Centre XE84*, *scanner A4 ACER S2W 3200V*, *Xerox XC23*

## **Conclusion**

The lecturers and students at Faculty of Geology and Geography at the University of Sofia are well aware of the potential of the use of ICT for improving geographical education. The main task for the future is to work on distance education in Geography, which will give more opportunity for open learning without limits in time and location.

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### **Useful Web sites**

- <http://www.uni-sofia.bg/faculties/geo/> - Faculty of Geology and Geography
- <http://www.gis.gea.uni-sofia.bg/en/> - Cartography and GIS department server

<http://www.uni-sofia.bg/resources/ucc/index.html> - University Computer Centre  
<http://ecet.ecs.ru.acad.bg/bvu/index.php> - Bulgarian Virtual University