

E
E
**EDUCATION IN POLAND - POPULARISATION OF THE GENERAL E
GEOGRAPHIC DATABAS E**

E
E
Iwaniak A.¹, Olszewski R.² E

¹) Institute of Geodesy and Photogrammetry, Wrocław Academy of Agriculture, Poland E

²) Department of Cartography, Warsaw University of Technology, Poland

Abstract E

The paper will present the authors' ideas concerning GIS popularization and education in the field of recognition and utilization of Geographical Information Systems in Poland. The educational project is directed towards pupils of secondary schools as well as students of non-surveying universities, and towards officials of governmental and local government administration. The proposed project will be implemented in 2005, in co-operation with the Head Office of Geodesy and Cartography.

The objective of the project is to popularize knowledge concerning:

- Development of geoinformation infrastructure in Poland,
- Modern methods of education in GIS and related subjects,
- Utilization of the, so-called, General Geographic Databases (GGD) for the needs of public administration.

E

◆ **Introduction E**

Developing a reasonable program for SDI (Spatial Data Infrastructure) in Poland, and, particularly, its planned for many years ahead implementation, requires a broadly undertaken popularization of geoinformation, geographic information systems, GIS tools, and the existing GIS data bases, both referential and thematic. Such popularization requires applying a two-faceted educational approach. On the one hand, it is important to convince the decision makers and the local and territorial geodesy administration to use the modern geoinformation solutions. On the other hand, an educational program should be proposed for schools. Courses on using, as well as designing, the geographic information systems, will be an interesting enhancement to the school programs in: mathematics, computer science, and geography. Such program for education is also advantageous for the long-term development and planning, as it will lead to the creation of a new intellectual elite and future decision makers.

Implementation of the school project is possible as a result of co-operation with the Head Office of Geodesy and Cartography. That Office made the digital spatial database (GGD) available for the needs of education. Geometric accuracy of that database corresponds to analogue products at the scale of 1: 1 000 000. GGD is an important component of the National GIS System in Poland. GGD represents a spatial data set - the reference for the other thematic data and objects. The General Geographic Database consists of the following thematic layers: administration zoning, settlement and anthropogenic objects, hydrography, relief, transport, land covering and land use, protected and restricted areas, geographical names.

The major advantage of GGD is its full coverage of the country with digital data of the relatively high level of timeliness. That advantage, as well as the availability of the GGD, free of charge, which is the result of the decision of the Surveyor General of Poland, allows for popularization of that product within the central and regional administration. Moreover, the perfect possibility to develop an attractive, interactive form of teaching geography and basics of GIS at secondary schools has also emerged.

The authors of this paper propose, that implementation of the presented idea is based on a series of lectures and practical exercises, with the use of modern Internet technology (WWW services developed basing on GeoMedia WebMap) as well as on the direct access to data on a CD, performed by a free GeoMedia Viewer. The proposed, dual-nature solution, results, first of all, from the disk size of the GGD database (approx. 160 MB). Utilization of WWW technology as the only medium, might lead to blocking of the services and disappointment of users. Despite considerable limitations (lack of spatial queries), the free data viewer is fast and allows for familiarization with the GGD and for development of simple statistical projects.

◆ **Frame program for the intermediate level schools E**

Partners: E

- 11 intermediate level schools from the District of Lower Silesia

Implementing institutions: E

- Agricultural Academy of Wroclaw, GIS Laboratory
- Wroclaw University of Technology

Premises: E

- very high popularity of the International GIS Day, as well as the GIS issues and digital cartography
- creation of information technology society
- popularization of the geographic information among the school level students

Achievements: E

- (improving) ability to read maps
- introduction to the GIS techniques (analyses)
- basics of spatial data integration
- ability to search for Internet services providing spatial data

Assumptions: E

- increase the students' interest in GIS and expand the teaching time devoted to it (currently the curriculum includes half a page about GIS)
- utilizing free software (no need to sign software licenses)
- sample data concern the area of Poland, freely available in the Internet
- voluntary classes, possible to execute at home

Means of realizability: E

- free GIS software - GeoMedia Viewer
- GGD 1M in GeoMedia format - data made available free of charge for educational purposes
- Internet - simple WWW pages
- course description in PDF and in WWW pages
- discussion list for the intermediate level school children related to the course program
- contests for the best spatial analyses (mini GIS project) sponsored by Intergraph (already agreed to)
- lectures organized at the Agricultural Academy of Wroclaw every other month
- all year GISDay covering various topics, prepared and conducted by experienced specialists
- regular workshops organized by the GISLab laboratory at the Agricultural Academy of Wroclaw
- collaboration in the school laboratories, technical support, practical training at schools for the Agricultural Academy of Wroclaw students (particularly those who study GIS education)

E Difficulties: E

- lack of good GIS texts
- weak English (but improving)

The proposed scope of the educational project includes:

Lectures: E

- history of conventional and digital cartography

- history of GIS and basic terms
- infrastructure of spatial data
- theory of cartographic projections
- spatial databases
- development of spatial information systems
- attribute queries and spatial analysis
- rules of utilization of visual variables for cartographic works.

Practical sessions (GeoMediaViewer): E

- development of thematic maps (cartograms)
- attribute queries
- simulation of spatial queries
- determination of the level of deformations resulting from assumed projections
- data integration with the MS Access database
- basics of map editing for printing.

Practical sessions (WWW):

- Spatial analyses.

◆ **Frame program for the administration E**

Participants E

- workers of the geodesy administration in Poland (approximately 5700) from the central, district, and local levels

Implementing institutions E

- Head Office of Geodesy and Cartography (GUGiK)
- four selected universities with educational programs in: geodesy, cartography, and GIS (Agricultural Academy of Wroclaw, Warsaw University of Technology, University of Warmia and Mazury, AGH University of Science and Technology)

Premises E

- the need to improve professional skills by persons involved in building NGIS and NSDI

Achievements E

- knowledge of geodesy and cartographic law, and selected elements of civil law
- topics in: organization, maintenance, and upgrading of the National Geodesy and Cartographic Data Base
- data acquisition, including: digital photogrammetry and GPS systems
- practical skills in the domains of:
 1. fundamentals of data bases
 2. data processing and analyzing
 3. cartographic projects

Assumptions E

- all universities have the same program, with the possibility of having individual facultative courses up to 10%
- a course lasts two semesters (200 hours or ten two-day meetings on weekends)
- the participation cost is repayed by the employer if the course is passed
- Head Office of Geodesy and Cartography (GUGiK) selects the participants

Means of realizability E

- each individual University's potential
- data bases emerging with the scope of NGIS, particularly GGD in the scale of 1:1M

Range of topics E

Module A. Legal and economic topics, 40 hours (30 hours of lectures and 10 hours of quiz sections)

- selected elements of civil law
- selected elements of administrative law

- legal regulations for geodesy and cartography
- European Union laws concerning spatial information
- organization, maintenance, and upgrading of the National Geodesy and Cartographic Data Base
- public-private partnership
- raising funds for the realization of geo-thematic projects
- fundamentals of business-plan creation and realizability studies
- administration of geo-thematic projects
- fundamentals of the operation of free-trade enterprises

Module B. Methodology and technology, 80 hours (40 hours of lectures and 40 hours of quiz sections)

- introduction, basic definitions and concepts
- introduction to the geographic information systems
- methods for the acquisition and processing of digital data, including:
- introduction to the digital photogrammetry and remote sensing
- GPS
- spatial reference systems
- creation of digital maps in CAD systems
- introduction to relational and object-relational data bases
- using GIS systems, spatial analyses
- cartographic modeling, map editing
- digital landscape model
- designing and implementing geographic information systems
- National Geographic Information System
- spatial data infrastructure technologies
- European Spatial Information Infrastructure (INSPIRE)
- standards

Module C. Interacting with users, 30 hours (20 hours of lectures and 10 hours of quiz sections)

- cooperation with the territorial governments
- e-administration
- the role of spatial information in the creation of information technology society
- using spatial data by:
 - agriculture (IACS-LPIS)
 - statistics
 - spatial planning
 - protection of the environment
 - other domains

Module D. Facultative courses, 20 hours

- classes designed by the university conducting the study (four topics, two of which are to be selected by the student)

Module E. Seminar work, 30 hours

- seminar classes and consulting with respect to preparing and presenting own work

Total 200 hours

The requirement for completing the study is writing a seminar paper and its presentation, completing the quiz section program, and passing the final examination.

E

E

Adam Bwaniak(iwaniak@ar.wroc.pl) is Assistant Professor at the Department of Geodesy and Cartography of the Agricultural University of Wrocław. His 1997 Ph.D. thesis was devoted to the application of expert systems in GIS. His interests were originally in developing software for geodesy, and since 1990 he has been involved in GIS. Since 1994 he also directs the LIS division at one of the largest mapping and surveying companies in Poland. His present interests concentrate on: application of expert systems to map generalization, data standards in GIS, and implementing industrial

GIS systems. Since 2002 he directs the GISLab at the Agricultural University of Wrocław. Since 2002 he is also a GIS advisor with the Surveyor General of Poland.

Robert Olszewski (r.olszewski@gik.pw.edu.pl) **E**

He is currently researcher and teacher at the Department of Cartography, Warsaw University of Technology. Since 1995 he has been active in Cartography and GIS. He completed his PhD (2001), with a thesis about fractal geometry and analyses.

His research interest involves:

- spatial data mining
- cartographic generalization
- fuzzy sets and systems
- neural networks
- cellular automata
- fractal geometry.

E