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TERTIARY STUDIES IN GEOINFORMATION ASPECTS OF MODERNIZATION IN POLAND

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Introduction

The dynamic development of information and telecommunication technologies and geospatial technologies as well as growing necessities of information societies that use these technologies create needs for the ongoing modernization of education processes in geoinformation. In addition, at this junction many activities of individual colleges, departments teaching these subjects or individual educational projects are insufficient. A more complex, interdisciplinary approach is needed, leading to the development of an educational system for this discipline, that should be compatible to the existing system of tertiary education in Poland.

This article shows general aspects and problems of the modernization of tertiary education in geoinformation in Poland, as an introduction to further articles published in this issue of Annals of Geomatics. They form a thematically cohesive whole and introduce in turn:

1. the development of geomatics as a subject of science, technology and education, especially in Canada (Zarzycki, 2009),
2. the characteristics of the geoinformation specialization program as a part of seven higher education fields of study including: informatics, geodesy and cartography, geography, geology, forestry, spatial development, mining and geology,
3. a framework concept developing the full study programs in geoinformation followed by the opinions of well known experts representing various colleges and educational subjects.

This material is fully up to date, since it was prepared immediately before publication. It provides a base for comparative analysis, conceptual work and organizational activities aimed at updating and modernizing programs of study, intercollegiate, interdisciplinary and international cooperation, and also at creating a consistent educational system in geoinformation.

Contributing authors, who sacrificed their time during summer vacation deserve special recognition.

General Assessment of Tertiary Education in Poland

The starting point for discussions in this article is a general assessment of tertiary education in Poland summed up in the report of the Organisation for Economic Co-operation and Development (OECD, 2007). This document stresses great achievements in a period after the fall of communism, and states:

- Poland in many significant respects joined countries with modern tertiary education systems, with its own creative system, adaptable to changes,
- The process of necessary changes is not finished, some of the most difficult problems are not solved; further reforms are necessary.

The most fundamental challenge was development of a consistent vision for target system of tertiary education in Poland. This vision should:

- establish social and economic purposes,
- depart from quantitative orientation with the stiff preservation academic structure,
- define relationships between teaching and research in various institutions and
- designate proper places for public, private, vocational and continuing education.

In the light of this report is worth noting the following problems:

- adjustments of education to changing social and economic necessities,
- orientating educational standards and programs towards achievement of results,
- intercollegiate and interdisciplinary cooperation,
- assurance of quality of education and
- internationalization of education.

Adjustment of Education to Changing Social and Economic Necessities

The number as well as the profile of graduates in a given field should be adapted to expected social and economic demand for the work of graduates after completing of studies and in their future employment. In general, we face the connection between „study market" and work market and its predicted development.

In Poland a specific market came into existence called here the study market, which is shaped on one hand by potentials and politics of colleges making offers and, on the other hand, by applicants for admission in a given field on study, making choices based on various objective and subjective criteria and motivations. On both sides economic factors play significant roles.

In that respect one feels the lack of central coordination. Planning of enrollment in given field of study by the colleges should be analyzed and assessed at the national scale, with consideration of enrollment in related fields, educational projects and special form of education in given field as well as regional needs.

The possible example of the result of lack of coordination and cooperation is seen, in the author's opinion, in the 2009 Geodesy and Cartography enrollment. Geodesy and cartography courses of study are offered by 18 colleges, including 9 public colleges. In total nearly 4000 places in engineering and about 1000 in master programs were offered (Geodeta, 2009). It is a ten-fold increase in comparison to the sixties and seventies of the last century, and then the number if geodesists and cartographers was sufficient to carry out large tasks, among others

in scope of geodetic control network and registry of land as well as the export of geodesy and cartography services. Is the spontaneous education in field of geodesy and cartography not going to turn into education of future unemployed people?

In case demand for work is difficult to assess, it is important to prepare graduates for continuing education, with the knowledge and learned skills gained in tertiary education making it easer for them to be employed in a wide spectrum of fields. From that perspective, the saturation of educational programs in geoinformation with informatics content is with no doubts justified.

In OECD report it is suggested in that regard to introduce the following general solutions:

- systems of information for prospective and current applicants for admission and students on trends of the work market,
- graduates career monitoring systems,
- mechanisms for tertiary schools to react to market needs mechanisms for increasing flexibility of studies to enable students to change tertiary school or the subject of study,
- organisational solutions which would increase participation of employers in adjusting educational offerings.

Orientation of Educational Standards and Programs Towards Achievement of Results

Every degree and certificate awarded can be defined by:

- the level of education,
- student effort expressed with ECTS points[1],
- coursework,
- teaching results with respect to the knowledge gained, skills learnt, and development of character.

In the evaluation of educational programs one has to consider most of all the results, instead of the method of obtaining them. This way the method is oriented towards the student not the teacher. Proposed subjects and approaches to teaching should be verified and modified, taking as a basis the expected results in the learning profile of graduates. He can be for instance a creator of geoinformation systems, a specialist in a field of geospatial technologies, a producer of geospatial data or a user of those systems, technologies and data in a particular field.

In this approach one should aspire to (Krasniewski, 2008):

- adaptation of the program supports various needs of student groups, for example foreign, working or disable students,
- securing agreeable conditions of work in tertiary school,
- facilitating access to services needed to students.

[1] European Credit Transfer System-consists of procedure drawn up by the European Commission allowing students to including courses from their studies in their home country and courses from international study to their required programs of study in their primary tertiary education institution. ECTS points numerically show the work effort of student necessary to obtain a passing grade for a particular course. In the majority of European countries the work effort necessary to successfully complete full year of study is 60 points.

Intercollegiate and Interdisciplinary Cooperation

The articles in this publication show the existing relationships in the field of geoinformation to various fields of study and at various tertiary schools, which enjoy in Poland significant autonomy. Close collaboration among tertiary schools and departments is extremely important and can take various forms, starting from the exchange of experiences and provision of educational materials, to jointly organizing and offering programs of study.

Good examples in this regard are collaborations with Dutch universities. Four well-known universities: Utrecht University, Delft University of Technology, The International Institute for Geo-Information Science and Earth Observation and Wageningen University joined their efforts and offer together a master program in geoinformation (Master of Science in Geographical Information Management and Applications). It is stressed that various approaches of collaborating schools supplement each other with benefits for students. A significant part of the program is offered as distant learning, full time (in two years) or part time (in four years). Possibilities for individual studies are provided, where special interests of students are also taken into account.

Useful can be also interdepartmental, that is interdisciplinary collaboration within a University.

In the field of geoinformation, it is recommended to make use of the new regulations of the higher education law (Ustawa, 2005) and its implementing rules (Rozporzadzenie, 2007), in particular those which refer to so called macrodirections (makrokierunki) and interdisciplinary studies (studia miedzykierunkowe)[2].

Assurance of the Quality of Education

Vibrant development of geoinformation tertiary education creates pressing needs to carry out on actions to ensure proper adequate quality of this education. One has to mention:

- applying the internal quality of education assessment system in the tertiary school,
- including in the process of quality assessment representatives of other tertiary schools and milieu outside of academia,
- introducing of model programs of studies for geoinformation specializations within individual fields of studies,
- using uniform terminology for teaching based on international standards,
- harmonizing teaching in terms of basic methods and techniques,
- taking into consideration opportunities of distant learning.

It has to be stressed that the creation of geoinformation as a field of study called for in this publication should have also a positive impact on the quality of education on geoinformation specializations in other fields of studies.

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[2] Definitions are given in the higher education law.

Internationalization of Education

Education in geoinformation (geomatics, geoinformatics), as a new and rapidly developing field, is especially susceptible to the internationalization processes, which should be used to benefit students, providing them widening possibilities to access the work market. Internationalization in this regard can be realized among others by:

- offering classes in chosen subjects in foreign language[3] for Polish students,
- offering full programs of studies in foreign language for Polish and international students,
- taking part in programs of studies and projects with international character,
- supporting the mobility of student sand lecturers on an international scale,
- the promotion of Polish tertiary schools abroad.

These actions should be in accord with the general goals delineated by the Bologna Declaration and by consecutive conferences of European Ministers of Tertiary Education to set up The European Higher Education Area (EHEA).

Summary/Conclusion

In reference to the content of this succinct article with introductory character to the whole issue the author proposes to undertake specific action aiming to modernize higher education in geoinformation in Poland. Comments on this subject are presented below.

1.The basic act of law concerning geoinformation in Poland will be the infrastructure of spatial information act. For the development of this infrastructure the education in geoinformationis of a primary importance. Because matters regarding the modernization of geoinformation education should be a subject of interest for the appropriate public administration ministry, in particular, according to law the General Surveyor of the Country and also the Council of Spatial Information Infrastructure. Addressee of proposals and initiatives in this regard should be the authorities mentioned above and counterparts in the ministry of higher education and appropriate tertiary schools. The Head Office for Geodesy and Cartography in Poland (Glowny Urzad Geodezji i Kartografii) should first provide analyses of social and economical needs in the context of geodesy and cartography education.

2. It is clear that success of all actions which aim to modernize education in the discussed subject depend on interested academic milieu, the involvement in these actions of scientists and academic teachers, and on their will, ambition and willingness to collaborate. One can hope that this publication and connected with it conference will contribute to useful initiatives uniting those milieus.

3. In the current economic situation the source of financing of these actions should be mainly European Union funds. Good projects are needed: feasible, justified and fully useful.

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[3] The preferred language is English.

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