

Chapter 21

The Effect of the Bologna Process on the Cartographic Courses in the Hungarian Higher Education

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Abstract

After the 1990 political reforms, it took several years until Hungary officially signed the Bologna Declaration (1999). The progress was very slow: the implementation of the Bologna principles only started in 2002. The nation-wide introduction of the BA and BSc system began in 2006 and will be continued at master level in 2009. One of the most important bodies in this process has been the Hungarian Accreditation Committee. This Board consists of university professors and academics and has control over the establishment and introduction of curricula at all higher education institutions in Hungary.

As for cartography and geodesy, we had two independent 5-year degree programmes in the pre-Bologna system (Cartography at Eötvös Loránd University, and Surveying and Geoinformational Engineering at the Budapest University of Technology and Economics) and two 3-year degree programmes in the College of Surveying and Land Administration in Székesfehérvár. Due to the integration of Hungarian higher education institutions in 2000, this college was incorporated into the University of West Hungary as a faculty. These institutions had worked a lot on establishing and developing their own programmes. However, due to the implementation of the Bologna process, these individual programmes have lost their



ICA Symposium on Cartography
for Central and Eastern Europe
Vienna, 16-17 February 2009

In: Georg Gartner & Felix Ortog (Eds.): Proceedings of the First ICA Symposium
for Central and Eastern Europe 2009, Vienna University of Technology, 2009.

independence. It is only natural that all these institutions were interested in finding a solution to keep as much of their original curricula as only possible.

Although about 140 BA and BSc programmes were established at national level, the Bologna system in Hungary did not allow any cartography-related BSc programme. However, Eötvös Loránd University and the Budapest University of Technology and Economics have established their MSc programmes that are related to cartography. Four universities also agreed on starting a new MSc in GIS, but the Hungarian Accreditation Committee refused the approval of their joint proposal. There are further cartography-related MSc programmes waiting for decision by the Hungarian Accreditation Committee. Some BSc and MSc programmes (such as geography and informatics) established specialization in GIS, and this gives us the opportunity of teaching cartography and GIS to a larger number of students.

Keywords: Bologna process, cartography, training

21.1 Introduction

In recent years, the higher education systems in Europe have been undergoing a major transformation influenced by national and international developments such as the rapid expansion of student enrolment and the increasing importance of research and innovation as well as the wider competition and cooperation between higher education institutions. The impact of the Bologna process on curricular reform, quality assurance and mobility has become one of the major factors of this change. Particularly in Hungary, where at the time of the political changes at the end of the 1980's it was only Albania whose statistical record was worse than that of Hungary regarding the relative number of university students in Europe.

The major aims of the transition process developed in 1999 and reconfirmed later at the higher educational ministerial meetings were as follows:

- adoption of a system of easily interpretable and comparable degrees;
- adoption of a system essentially based on two main cycles, undergraduate and graduate;
- establishment of a system of credits as a proper means to promoting the most widespread student mobility;
- promotion of mobility by overcoming obstacles to the effective exercise of free movement;
- promotion of European cooperation in quality assurance with a view to developing comparable criteria and methodologies; and
- promotion of the necessary European dimensions in higher education.

The main objective is to create a European Higher Education Area by 2010, in which the mobility of staff and students and the recognition of studies will be easier. The new system would place the diversified national systems into a common frame based on three outcome levels.

In Hungary, after a new law on the higher education in 1993, the universities gained more autonomy and the state control decreased. However, the dual institutional system with universities and colleges along with a dual training system remained untouched. In 1996, significant modifications of the act were accepted, and this made all higher education members realize that the universities would have to shift to a cycled system. Hungary signed the Bologna Declaration in 1999, but only a limited progress was made in the following years. The slowness of changes was partly due to the institutions, who were convinced that the quality of training in the Hungarian system was better than that of Western Europe.

A major step towards restructuring the system was made in 2000, when an important act on institutional integration came into force. This merged the small universities with the larger ones located in the same city or region into large local or regional universities. This concentration of institutions has halved the number of universities for a few years. Nevertheless, many of the old problems and contradictions (parallel structures and positions, share of profits and deficits etc.) remained. In 2002, Hungary started to adopt the principles of the Bologna process. Governmental decrees introduced a new cycle system and qualifications framework for the higher education. New processes of founding and accrediting new bachelor and master programmes were also introduced.

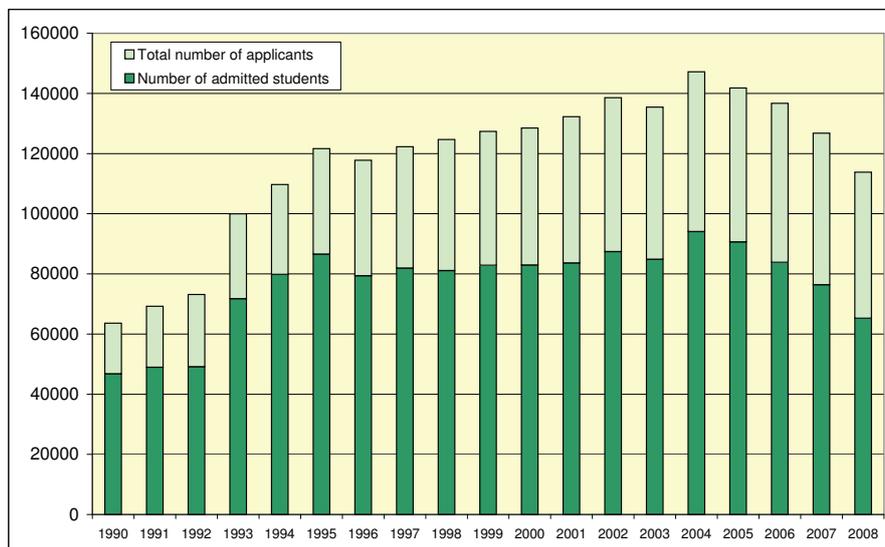


Fig. 21.1. The number of full time students in the Hungarian higher education

The latest act on higher education in 2005–2006 legalized the cycle system and gave up the former dual system. The higher education institutions are now obliged by law to launch programmes based on three cycles with effect from the 2006–2007 academic year.

21.2 Cartography programmes and courses in the dual system

Altogether, there were ten universities and colleges in Hungary where cartographic and GIS courses were included in the curricula to a various extent in the old system. Three higher education institutions with a relatively long tradition of teaching our profession offered degree courses in disciplines related to cartography.

21.2.1 Eötvös Loránd University (Budapest)

The Department of Cartography was formed in 1953, when an independent 3-year cartography programme was developed by the first head of the department, László Irmédy-Molnár, a former military officer. It is interesting to note that the system almost perfectly followed the Bologna model, because the programme was only available for those students who had already studied geography for two years. In the first twenty years, the programme was only offered in every third years.

Due to the higher education reform in the 1970s, the training has slightly changed. The bachelor-like curriculum based on geography was replaced by courses on earth sciences. Students had to take the earth sciences courses, and after the first two semesters they had to specialize in either in astronomy, cartography, geology, geophysics or meteorology. This system remained unique in Hungary: no other universities in Europe introduced a programme like that.

The 1986 act on education gave the universities the opportunity to form independent 5-year programmes for all the former specializations in earth sciences. The last students of this 5-year cartography programme were enrolled in September 2005. Altogether, 437 students got a degree in cartography since 1957, when the first students completed their studies. Out of them, 264 students got their degree in the former (Bologna-like) system. Meanwhile, in 2003, the department changed its name to Department of Cartography and Geoinformatics and became a part of the newly established Faculty of Informatics. This name and organisational change is meant to reflect the inevitable transformation and modernization that we can all see in our discipline.

21.2.2 Budapest University of Technology and Economics

This university was known until 2000 as the Technical University of Budapest. Its history goes back to 1782, when Emperor Joseph II established the Institutum Geometricum as a part of the Faculty of Liberal Arts at the University of Buda. (This is one of the historical names for Eötvös Loránd University.) The Institutum, the direct predecessor of the Technical University of Budapest, was the first in Europe to award engineering degrees to students of land surveying, river control and road construction. The institute was reorganized in 1871 as Royal Joseph Technical University and was elevated to equal rank with other universities in the country. Between 1860 and 1880, more than 100 diplomas in civil engineering were handed over. In 1949, the Faculty of Civil Engineering, a part of the Technical University, was formed in Sopron, a town on the Austrian border. A new, independent geodesy programme was established there. Meanwhile (1951–1953), in Budapest the Cartographic Division of the Faculty of Military Engineering started a 3-year degree programme in geodesy, but only 27 students were trained in the three years of its existence.

The Faculty of Civil Engineering was moved from Sopron to Budapest in 1959. The courses on geodesy were taken over by the Faculty of Engineering. This re-organization has affected the curriculum of the programme, because all subjects of the faculty were the same for everybody in the first two years. The university formed three new departments (Geodesy, Applied Geodesy, and Photogrammetry) in order to manage the courses in geodesy. In 1967, the name of the Faculty of Engineering was changed to the Faculty of Civil Engineering and the title of the degree was changed to civil engineering with specialization in geodesy.

In 1992, due to the changes in the Hungarian higher education, the programme became independent (they also included GIS), but the first four semesters remained common, that is the students got the same training as the civil engineers. In 1998, the university changed its structure again: only two departments became responsible for the education of geodesy (the Department of Geodesy and Surveying, and the Department of Photogrammetry and Geoinformatics).

In the first 50 years of the training of surveyors (1949–1999), somewhat more than 1300 degrees were handed over.

21.2.3 University of West Hungary (Sopron, Székesfehérvár)

After WW I, the former Mining Academy moved from Selmecbánya (nowadays Banská Štiavnica, Slovakia) to Sopron. In 1962, the University of Forestry and Wood Sciences of Sopron was established with the faculties of Forestry Engineering and Wood Sciences Engineering.

The College of Surveying was formed in the town of Székesfehérvár in 1962. At that time such institutions trained lower level industrial managers. In 1972, this college became a part of the University of Sopron (later renamed as the University of West Hungary) and became the Faculty of Land Surveying and Mapping. The training of surveyors in a 3-year programme started here. Three years later, the land administration programme was also introduced at this faculty. Students who completed their studies of surveying in Székesfehérvár got a college diploma, and some of them continued their studies in the Technical University of Budapest for a university degree in surveying. In 2001, a new programme was developed for real estate and property registration and management.

Till 1993, the university was directed and supervised by the Ministry of Agriculture, but the 1993 act on higher education transferred the supervision to the Ministry of Education and Culture. The present name of the institution is Faculty of Geoinformatics and forms a part of the University of West Hungary based in Sopron.

21.3 Transition to the Bologna system

The pre-legislation work of the government decree introducing the change-over included the concentration of the fields of studies, which used to be highly fragmented: not long ago, there were 214 college level and 199 university level (altogether 413) degree programmes in Hungary. This work was coordinated by the National Bologna Board, which involved all Discipline Specific Bologna Committees. 102 new bachelor programmes were launched in the first cycle of the two-cycle system, while all the ongoing old programmes are running out. Since religious and art BAs were added a little bit later, finally 148 bachelor programmes are now available. The first bachelor programmes were introduced in the fields of technology and agriculture already in 2005. With the exception of six single or undivided programmes leading to a master's degree, the multi-cycle system according to the Bologna model started in all fields of study in Hungary as of 1 September 2006. Unfortunately, this process was not consistently linked to the establishment of the programmes of the second cycle.

While the bachelor programmes were developed and coordinated centrally, the master programmes are developed by the universities. The higher education institution may launch bachelor and master programmes after having obtained the consent thereto in the expert opinion of the Hungarian Accreditation Committee (MAB), and following the central registration of the given programme. After the MA or MSc programme is accredited by the MAB, the programme and the graduation requirements are published as a part of a governmental decree. The decree deter-

mines the graduation requirements for each bachelor and master programme, that is the knowledge and competencies whose acquisition is the precondition for the diploma to be awarded. One of these conditions – though this has been in force for more than a decade – states that any bachelor or master degree can only be obtained if the student has passed a state exam of a foreign language at an intermediate level at least. Strange though, foreign language classes on the technical language of cartography and related subjects are only rarely available for the students during their university studies.

Every Hungarian higher education institution has the right to start any programme. The institutions have to describe their capacities (staff, infrastructure) in their application. They will get individual accreditations for all their MA or MSc programme proposals. The MAB also examines the level of training and whether the institution meets the accreditation requirements in respect of the teaching staff and infrastructure once in every eight years.

21.4 Cartography programmes and courses in the Bologna system

21.4.1 Bachelor level

There are specializations available in the following BSc programmes (the specialization may start after a certain number of semesters):

- Earth Sciences
 - Cartography
- Land Surveying and Land Management Engineering:
 - Geoinformatics
 - Land management
 - Land registration

There was a specialization planned in the Computer Engineering BSc by a new college, but it was rejected by the MAB. The institution itself was not accredited by the Ministry of Education and Culture. There is an opportunity of “internal specializations” in other bachelor programmes, but they are not defined in the decrees.

As already mentioned, there are no special cartographic bachelor programmes. However, the subject of cartography, geodesy and GIS is taught in the following BSc programmes:

- Cartography:
 - Earth Science Engineering
 - Military Economics
 - Military Officer Training
 - Policy Administration
- Geodesy, surveying:
 - Agricultural Environmental Management Engineering
 - Forestry Engineering
 - Land Surveying and Land Management Engineering
- GIS:
 - Agricultural Computing and Public Administration
 - Agricultural Environmental Management Engineering
 - Civil Engineering
 - Earth Sciences
 - Garden and Landscape Architecture
 - Geography
 - Land Surveying and Land Management Engineering
 - Military Officer Training

21.4.2 Master level

As said, the higher education institutions are free to establish their set of master courses, but in the first step the programme will have to be examined by the MAB. After receiving the positive decision and when the programme and graduation requirements are accepted, any Hungarian institution may launch the programme (this second step is also supervised by the MAB). At the end of 2008, there were 229 master programmes, where the governmental decree determined the programme as well as the knowledge and competency requirements (with the exception of certain teachers' training programmes). However, only about 200 master programmes will be available for the students. The reason is that there are several master programmes established, but none of the institutions in Hungary managed to fulfil the criteria of the MAB to announce starting them. Although the master programmes will start in September 2009, the process of developing the new master programmes has not been completed yet. Therefore, it is quite probable that further new programmes will be launched later.

The following master programmes will be available for the students in our professional area as of September 2009 (list of universities that has received permission from the MAB to start the programme):

- Cartography (Eötvös Loránd University)
- Land Management (University of West Hungary)
- Land Surveying and Geoinformatics (Budapest University of Technology and Economics)

Relevant specializations in other master programmes:

- Geography MSc (though five universities have the right to start this programme, but not all of them can start the relevant specialization)
 - Specialization in Geoinformatics (the University of Szeged is said to be ready to start the specialization in 2009)

Like in bachelor programmes, internal specializations will be offered in other master programmes. However, they are not defined in the decree and the relevant information is not collected centrally. According to the available information, Computer Science and Information Technology master programmes will have this kind of specialization in GIS.

Four universities (Eötvös Loránd University, University of West Hungary, University of Szeged and the University of Debrecen) collaborated in developing the master programme in GIS. In spite of the support of the prominent Hungarian GIS companies, the MAB refused the approval of the proposed programme. The partner universities are thinking on re-working the curricula and submit the accreditation application in the future. All of these universities offer GIS-related subjects and knowledge in other master programmes, but they believe that an independent master programme in GIS should be available in Hungary.

21.4.3 Doctoral studies

In the higher education system, doctoral studies constitute the third training cycle designed to prepare students for obtaining a PhD degree. As early as in 1993, the Higher Education Act created the conditions for establishing a new type of doctoral studies. Previously the Soviet type of system was used, when a similar degree – CSc – was awarded by the Hungarian Academy of Science. This act provided an institutionalised form for the training and ensured a regulated organisational framework for doctoral studies, which fundamentally differs from the ‘one PhD student – one consultant’ model. This third cycle of training is less affected by the Bologna process in Hungary, because the system has been working for fifteen years. Therefore, the transition does not require serious changes.

Doctoral studies may be offered by higher education institutions which also provide master training in the given branch of science or art (except in the field of arts). The organisation of doctoral studies, the assessment of the performance of the PhD student and the consultant as well as conferring the doctoral degree fall within the powers of the doctoral council of the higher education institution or the discipline-specific doctoral council. In our profession, the following doctoral schools are entitled to offer PhD programmes:

- Budapest University of Technology and Economics
 - Doctoral School of Earth Sciences
- Eötvös Loránd University
 - Doctoral School of Earth Sciences
 - Cartography, Geography-Meteorology, Geology-Geophysics
 - Doctoral School of Environmental Sciences
 - Environmental earth sciences
 - Doctoral School of Informatics
 - Information systems
- Szent István University, Gödöllő
 - Doctoral School of Environmental Sciences
- University of Debrecen
 - Doctoral School of Earth Sciences
 - Landscape protection
- University of Miskolc
 - Doctoral School of Earth Sciences
 - Methods and applications in geotechnology
- University of Pécs
 - Doctoral School of Earth Sciences
- University of Szeged
 - Doctoral School of Earth Sciences
 - Spatial representation of socio-economic processes
 - Doctoral School of Environmental Sciences
 - Environmental geography
- University of West Hungary
 - Doctoral School of Environmental Sciences
 - Geo-environmental science
 - Doctoral School of Forestry
 - Geoinformatics

Due to the interdisciplinary topics, it is not easy to summarize the number of PhD degrees annually awarded in our profession, but 4-5 holders per year is a good estimation. This number of new PhD degree holders is sufficient to guarantee the presence of cartography in the Hungarian and the international scientific community.

21.4.4 Specialised Graduate Studies

Higher education institutions may also offer postgraduate specialist training for bachelor and master degree holders. This type of education is fairly common in certain areas, but nearly unknown in some others. The specializations of bachelor and master programmes can be also offered as postgraduate specialist trainings, but most of these trainings are specially developed. Their accreditation process is not complicated, though the programmes and graduation requirements are worked out centrally by the Educational Authority. The trainings are also registered by this authority. There were nearly 18 thousand participants registered in this form of training in Hungary in September 2008. In our profession, this kind of training is offered mostly for master degree holders.

21.5 Cartography in the curricula in the Bologna system

The new Higher Education Act has lifted several former restrictions in order to allow higher education institutions to more effectively and efficiently co-operate with the business and social partners in the fields of research and development, innovation, training and services. The development of training and graduation criteria of the first cycle training in the Bologna system was performed partly with the participation of the actors in the economy.

All institutions – not only in our profession – tried to save their existing programmes, but they were also quite creative to establish new master programmes. Although our collaboration to create a new master programme was unsuccessful, the Bologna system allowed the institutions to start others programmes that have already been accredited by the MAB. It is mostly a theoretical possibility at the moment that the success or the failure of certain programmes may tend the institutions to start popular programmes (where they have a chance of attracting more students) and to discard the less popular ones. This may stimulate the departments and faculties who are responsible for the courses to keep and improve the quality of their programme.

It can be stated that the position of cartography in the Hungarian higher education system is balanced and well distributed. Each university has its own characteristics and the universities are rather allies and not rivals. We occasionally help

each other's education, share our experiences. With the help of good relationship and contribution of external professors and experts, all of our master programmes are linked both to the state and business sectors. The institutions are sensitive to the technical developments and include them in the courses. However, the continuous decrease in the number of potential students and the unpopularity of technical and science programmes may cause the decline in the number of students.

It is worth mentioning that subjects related to cartography appear in several other master programmes, and this may give higher reputation to our professors and experts. The following master programmes include cartographic subjects in their curricula:

- Agro-environmental Studies
- Business Information Systems
- Computer Science and Information Technology
- Cultural Heritage Studies
- Disaster Protection Engineering
- Forestry Engineering
- Geography
- Geological and Geophysical Engineering
- Geophysics (specialization in Space Science and Remote Sensing)
- Library and Information Science (specialization in Processing of Old Documents)
- Management of Border Policing and Protection
- Military Leader Training
- Military Logistic Management
- Mining and Geotechnical Engineering
- Nature Conservation
- Security and Defence Policy
- Structural Engineering
- Transportation Engineering
- Urban Planning
- Vehicle Engineering
- Wildlife Conservation and Management

21.6 Conclusions

Although Hungary is still in the middle of the Bologna transition process, we have already some experience:

- The higher education institutions try to keep their former programmes by transforming them into a Bologna-style programme.
- Cartography will never attract a large number of students, but the institutions are ready to keep these programmes as long as the number of students is enough to finance the programme. Actually, all the cartography-related master programmes listed in this paper are taught only in one Hungarian institution. Theoretically, it may happen that further institutions start training in our profession, but the quality assurance role and power of the MAB may prevent these new institutions from getting the accreditation of certain programmes if they cannot prove that they can fulfil the strict administrative and professional criteria. It is obvious that the number of qualified staff is rather limited in Hungary and can hardly sustain any additional cartography-related programme.
- The easier mobility for students in the Bologna system will certainly enrich our profession. We have to be open to accepting and training international students from programmes that we do not have. If the courses and the knowledge we offer look useful for them, this may generate more interest and more students.
- The “solve the quality vs. quantity” issue is an important task of the near future. One of the most important characteristics of the Hungarian higher education was the dramatic increase in the number of young people wishing to study. Between 1990 and 2008 the number of students increased significantly, by more than 380%. In our field, the increase in the number of students was not so high, because the labour market has not increased so much. One of the strengths of the Hungarian higher education – despite becoming massive – is the more or less preserved high standard, but to keep this level we have to give more chance and special care to the outstanding students.

References

- Péter Bíró. “A földmérőmérnök-képzés 50 éve” *Geodézia és Kartográfia* 1999, 12, pp. 5-10 (50 years of surveyor-engineer training)
- Gábor Gercsák. “A szakmai és nyelvi képzés kapcsolata” *Geodézia és Kartográfia* Budapest, 1999, 1, pp. 36-37 (The relationship between professional and language training)
- András Homolya–András Krauter–Ferenc Noéh. “A Geodézia című tantárgy oktatása a Műegyetemen” *Geodézia és Kartográfia* 2002, 10, pp. 13-17 (Geodesy courses at the Technical University of Budapest)

- István Joó. "A magyar felsőfokú földmérő-térképész képzésről" *Geodézia és Kartográfia* 2001, 6, pp. 7-12 (Training surveyors and cartographers)
- B. Székely–E. Király. "Casualties and winners of the Bologna process in geoscience: Changes in the field practicals due to the transition from five-year MSc curriculum to BSc+MSc curricula – a case study from Hungary" *Geophysical Research Abstracts* 2008, 10: 05094