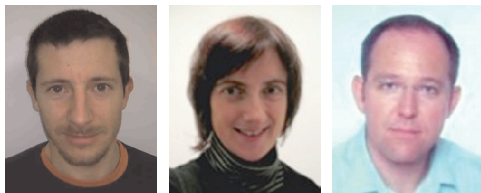


Can European graduates fulfil the expectations of Slovenian (private) enterprises?



*Andrej Mesner, Anka Lisec, Samo Drobne,
Ljubljana, Slovenia*

Abstract

Liberalization of services and international recognition of professional competences are a topical issue of the international agenda. In the European Union, an additional challenge is the EU market, which provides the framework for free trade in professional services within the EU member states. Consequently, the professional qualifications, which have to meet the labour market needs, have to be recognized on the international level. The competences of the graduates and whether these competences are in line with the demands of the employment areas (in particular of the private enterprises) are discussed in connection to the field of surveying in Slovenia. In addition, some main findings regarding the requirements of the European enterprises in the surveying profession are given, based on the research within the framework of the EEGECS (European Education in Geodetic Engineering, Cartography and Surveying). We try to emphasize the importance of collaboration between private/public sector and higher educational institutions in order to develop and/or adjust higher educational programmes to the technological and methodological development, and to the market needs, which would fulfil wide spectrum of the market needs.

Keywords: Surveying, geodesy, skills of graduates, private enterprises, Slovenia

1. Introduction

Each profession has to respond to the challenges of globalization, which dictates liberalization of trade in professional services. The international market pressures, including the regulations towards liberalization of trade stimulated by the World Trade Organization (WTO), and the EU free market within the EU member states, are reflected also in the surveying profession and surveying higher educational programmes throughout Europe. The rights of the EU citizens to provide services anywhere in the EU are fundamental principle of the EU law. However, the national regulations and in particular licensed professions, such as surveying is in several European countries, are serious obstacles to these fundamental rights.

Traditionally, the surveying profession predominantly operated in the niche markets, which were either local or national in character. These regulated markets are not conducive to mobility of professionals, due to the wide variety of procedures, laws, and functions performed by surveyors. However the non-regulated part of the surveying market is highly conducive to mobility. The European Commission has perceived the mutual recognition as a device for securing the free mobility of professionals within the single

market place of the EU. Mutual recognition can be defined as a process which allows the qualifications gained in one country to be recognised in another country [1]. Although there are a number of barriers, which hinder mutual recognition at a world scale, such as language, national customs, culture etc., the free movement of professionals can be based on the definition of the qualifications required for professionals to practice in a profession or discipline. The European Ministers of Education made a joint declaration (Bologna agreement) in June 1999 to coordinate their policies to achieve the adoption of easily comparable higher educational degrees. Modernization of higher education in Europe is an ongoing process which tries to follow the main guidelines of Bologna declaration and market needs.

Establishment of the common European higher education area is very important from the perspective of globalization process and development of the European common market, which dictates high level of knowledge and comparable educational competences all over Europe. Private enterprises as well as public agencies (institutions) would like to get highly qualified graduates of surveying (geodesy) with as many competences as possible directly from the universities. However, not only the educational outcomes

(which have to adopt the needs of society as well), but general ability of the individual to apply knowledge and skills to produce a required outcome have to be defined in a standardized form, often mentioned as professional competency standards.

In this respect, the question arises: "How can higher education institutions and their graduates fulfil the expectations of the labour market?" The topic of establishing the equilibrium between the labour market needs and developing trends of the higher educational curriculum is illustrated on the case of Slovenian labour market in the field of surveying (geodesy), where a brief comparison with the European area is given as well. For this purpose, the results of analysis of questionnaires among employers and graduates in surveying profession in Slovenia are given. Furthermore, a brief overview of the EEGECS (European Education in Geodetic Engineering, Cartography and Surveying) research among employers on needed professional competences of graduates in surveying is given, which was done in 13 EU member states.

2. Slovenian labour market needs in the fields of surveying

Professional competences of a graduated surveyor, defined by the labour market, have been changing very rapidly in the course of the last decades. This is mainly the consequence of globalization trends, changing needs of society and technical development, which forced in particular private enterprises (as well as public sector in the fields of surveying) to take up a challenge and adjust their fields of work to the current and future needs.

The higher educational study programmes of surveying as well as professional competences of surveyors vary among the EU countries mainly due to historical reasons and regulatory framework of the profession. However, surveying has traditionally leaned strongly towards engineering. Nowadays, the need to shift to teaching management skills applicable to interdisciplinary work situations is obvious in almost all European countries. There have been several discussions on competences of surveying profession, based on the international comparison of higher educational curricula and professional competences, in order to support the international mobility and international trade in surveying services (see [2], [3]).

Comparable to other EU countries, globalization, interdisciplinary and technical development has forced many Slovenian private enterprises to change fields of work. This is the reason why they need different working profiles also in the field of surveying. The only higher educational programmes in surveying in Slovenia are performed at the University of Ljubljana, Faculty of Civil and Geodetic Engineering, Department of Geodesy. Although the higher educational programmes in surveying (geodesy) at the University of Ljubljana have tried to be flexible and adjusted the curricula to the needs of the profession (there was a considerable renovation of study programmes within the Phare-Tempus project (1996-1999)), the renovation of study programmes according to Bologna guidelines provided a new opportunity for important changes in the educational competences of surveying (geodetic) graduates.

For this purpose, the research was done by the University of Ljubljana, Faculty of Civil and Geodetic Engineering, Department of Geodesy in 2005 and 2006, which aimed to gather useful data from the Slovenian labour market in order to get information for development of the new Bologna programmes of geodesy (surveying, geoinformatics). The research of the surveying labour market in Slovenia was based on two questionnaires. The first one was the questionnaire for graduates about the study programmes of surveying (geodetic) engineering in Slovenia (see [4], [5]). The second questionnaire was completed by the employers who had to answer about study programmes of surveying (geodesy) in Slovenia and educational competences they expected from the graduate (see [4], [6]).

2.1 Employers' opinion of the Slovenian higher education in surveying

For the quality of renewal of the study programmes, the opinions of experts outside the university environment are appreciated. For this purpose, the analysis of employers' (whose main field of work is surveying profession and related disciplines) opinion of study programmes of surveying (geodetic) engineering at Faculty of Civil and Geodetic Engineering was performed in 2006 [6]. The main aim of the analysis was to find out the ratio between the expected and achieved abilities, skills and knowledge, which should be achieved by graduates in surveying (geodesy) during their study at university or higher professional degree. The questionnaire contained the following complexes of questions (see [4], [6]):

- (a) general information about company/institution (name, field of activity, number of employees);
- (b) general opinion of achieved graduates' level of knowledge and skills important for the employer;
- (c) evaluation of expected and achieved abilities, skills and knowledge, which should be achieved by graduates of surveying (geodesy) during their higher education: (c1) the ability to apply knowledge in practice, (c2) the ability to develop the profession, (c3) the knowledge of management, (c4) the knowledge of legislation, (c5) the knowledge of standards, (c6) the knowledge of informatics and an ability to use new information technologies, (c7) the ability to communicate effectively, (c8) the ability to lead and coordinate the projects/organization, (c9) other abilities and skills (ethical loyalty, an ability to work in multidisciplinary teams etc.); and
- (d) estimation of five most important abilities among seventeen suggested.

work at their companies. Their main subjects of critique are regarding graduates' ability to apply knowledge of business management techniques. Fig. 1 shows employers' opinion regarding the qualification of geodetic graduates.

Employers of geodetic graduates estimated also five most important abilities among seventeen suggested ones. There are some differences between public institutions and private enterprises. For public institutions the most important skills of the graduates are [4]:

- basic knowledge of surveying and geodesy,
- basic knowledge of profession (wider area of profession),
- the ability to apply knowledge to practice,
- the ability to accommodate oneself to a new situation, and
- the ability to acquire knowledge.

In contrast to the employers in public sector, the representatives of the private enterprises emphasized the skills of graduates in this order [4]:

- the ability to understand and communicate in foreign language,
- the ability to apply knowledge to practice,
- the basic knowledge of surveying and geodesy,
- the basic knowledge of profession (wider area of profession), and
- the ability to create and implement new ideas.

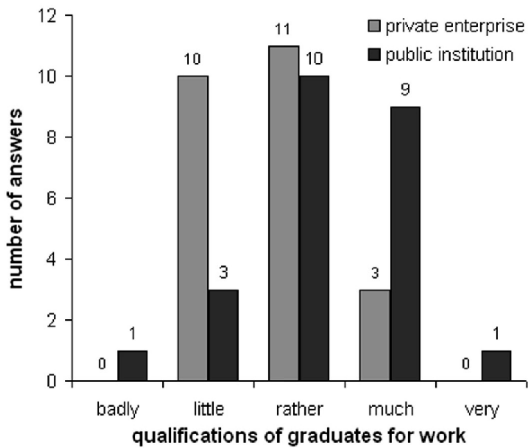


Fig. 1: Employers' opinion regarding the qualification of graduates in surveying (geodesy) at the Faculty of Civil and Geodetic Engineering, University of Ljubljana, to begin to work at their companies.

In the research, 50 different employers of surveying diploma engineers answered the questionnaire. The general opinion of Slovene employers in the fields of surveying (geodesy) is that (university) diploma engineers of surveying (geodetic) engineering are rather prepared for work in their company. But, employers in private companies are more critical regarding the qualification of geodetic graduates to begin to

2.2 Graduates' opinion of the Slovenian higher education in surveying

In 2005, the analysis of graduates' opinion of study programmes of geodetic engineering at Faculty of Civil and Geodetic Engineering, University of Ljubljana, was performed [5]. Slovenian academic education of surveying (geodetic) engineering was based on German educational system. At the moment, the study programmes are in transition to the new programmes following the Bologna guidelines. However, at the time of the research, two programmes of the higher education in surveying (geodesy) were performed (diploma degree) [4]:

- University study programme of geodesy (9 semesters), which was comparable to the master's degree in countries using consecutive system of higher education.
- Higher professional study programme of geodesy (6 semesters), which was comparable to study programmes at Universities or Colleges of Applied Sciences.

The questionnaire for graduates contained the following complexes of questions:

- (a) general information about (university) diploma engineer, his/her occupation and position, information about the institution and the field of work;
- (b) evaluation of (b1) the volume of study courses in the time of his/her study; (b2) requirements of study courses; (b3) applicability of knowledge and skills obtained during the study; (b4) importance of knowledge and skills for the future;
- (c) missing knowledge and skills, and
- (d) suggestions for improvement of study programmes.

In the analysis, 50 university diploma engineers (university study programme) and 48 diploma engineers (higher professional study programme) answered the questionnaires.

The graduates in surveying (geodesy), who answered the questionnaire, did not have problems to find a job – they found job very quickly after they graduated, in less than one month. The fields of their work were from geodesy, land surveying, spatial data management, to land administration, land management, which is covered also by the newest definition of surveying profession (see [7]).

The main aim of the research was to find out the ratio between the knowledge and skills acquired during the study at the faculty, and actual applicability and utility in the praxis. In general, diploma engineers of both study programmes suggested that the volume of courses referring to the real estate registration and real estate management as well as courses in the fields of legislation, public administration and business economics could be enlarged. Both groups of questioned graduates agreed also that the importance of topics of real estate registration, real estate management, spatial informatics, legislation and business economics should be increased significantly in near future.

3 Permanent education in the (private) enterprises in some EU member states

Within the framework of European thematic network EEGECS (European Education in Geodetic Engineering, Cartography and Surveying), WG 4 – Public/ Private Enterprise, the needs of surveying (private) enterprises in some EU member were analysed based on a questionnaire

for employers. The questionnaire was completed by representatives of 104 enterprises from 13 EU countries [8]. The results of the research gave an overview of the current situation of the surveying profession and employability of graduates in surveying in Europe, where following aspects were considered:

- Segmentation and main fields of activities of private/public enterprises;
- Number of graduates within the company;
- Main fields of activities of graduates within the companies;
- Skills of graduate staff expected by the enterprises;
- Continuous Lifelong Learning;
- Mobility across Europe.

The questionnaire was rather complex; we would like to emphasize in particular the needs of the employers regarding continuous lifelong learning.

3.1 EEGECS

The thematic network EEGECS (2002-2008) was the results of the vision for the Common European Area of Higher Education and was established within the Erasmus programme of the European Commission. As a part of the former European Socrates-Erasmus Programme, the thematic networks were launched officially in May 1996. The original purpose was to help higher education institutions to create forums with the aim to analyse and study the state of development of various education and training fields in Europe in order to encourage the European dimension and improve the quality of education and training. Generally speaking, a thematic network presents a co-operation between departments of higher education institutions and other partners (e.g. academic organisations or professional bodies). All countries participating in the Socrates-Erasmus programmes (EU, EFTA and Candidate Countries) had possibility to be involved in a thematic network. The main aim of the programme is to enhance quality and to develop a European dimension within a given academic discipline or study area [9].

The thematic network EEGECS, which was established in 2002 and later connected over 100 institutions from 27 European countries, aimed to facilitate trans-national access to educational resources in Europe. The EEGECS is a project originally created by Geodetic Engineering, Cartography and Surveying institutions whose main objective was to enhance collaboration and

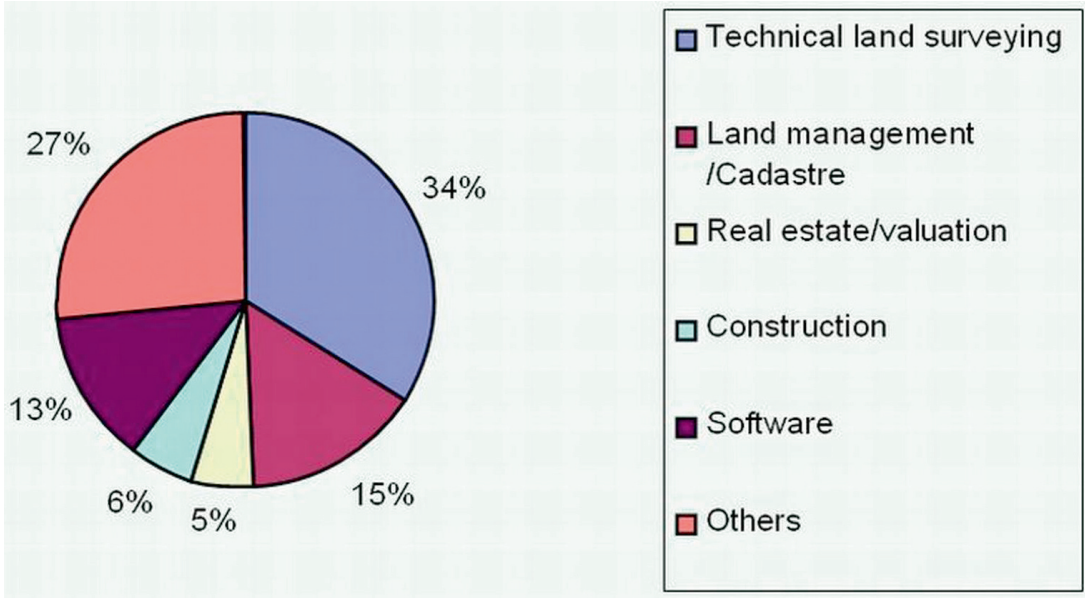


Fig. 2: Companies' main activities [8].

co-operation between the higher education institutions which offer these studies and studies from related fields [10]. The work was organised in six working groups. One of the focuses of the EEGECS was the research of labour market needs in surveying, geodesy, cartography and related fields, which was mainly studied in the WG 4 – Public/ Private Enterprises.

3.2 Some basic findings of the EEGECS research

Simple survey of the main fields of activities of the companies, that answered the questionnaire, showed that their field of work is focused on technical land surveying, which takes in average more than one third of the companies recourses, another 27% flows into the other activities, mainly administration, marketing and promotion and management. Land management covers 15% of the company's activities, software development 13% and real estate economics and land valuation and construction are of minor relevance (Fig. 2, see also [8]).

The official academic education presents only a part of the professional competences - because of the fast developing technology and changing needs of society, each individual has to upgrade his/her knowledge and skills in the profession as well as in the other fields referring to his/her work,

the analysis of lifelong learning practice in the companies was performed. The analyses of the questionnaires showed that more than 65% of the companies support life long learning activities of their graduate employees. Almost half of them cover the course costs and provide working time for training programs. The largest number of persons is getting training in the fields of management skills, communication skills and Information and Communications Technology (ICT) skills (Fig.3).

4. Market needs of enterprises in Slovenia in comparison to other EU countries

Based on the EEGECS research on skills of graduates required by European enterprises, we can say, that the European enterprises, working in the field of surveying and related fields, have similar demands for graduates. However, we can not directly compare the results of the analysis, performed by the Faculty of Civil and Geodetic Engineering, University of Ljubljana, and the EEGECS, because questions and structure of questionnaires was not the same. Nevertheless, we can get general idea about the needs and expectations of Slovenian and EU enterprises from graduates in the fields of surveying (geodesy).



Fig. 3: Number of persons trained per year [8].

In general, we can say that (private) enterprises expect graduates from the university to have more skills and professional competences as they get it during the period of study. On the other hand, it is interesting, that in Slovenia, all graduates get work in one month after they finish their study (study from 2005, [5]). There are different kind of enterprises and different fields of work where graduates in Slovenia are employed. The employers' institutions can be classified considering different aspects:

- private – public;
- small – medium – big enterprise;
- mostly surveying field of work – partly surveying field of work – other field of work.

Expectations also vary according to the above mentioned groups because we can not for example compare small company (2 employees) with public institution (few hundreds employees). The small companies mostly work in the traditional fields of surveying (engineering surveying, geodetic surveying, real estate registration etc.) and they need graduates with a lot of professional practical knowledge. Bigger companies, which have more experts, can arrange their own education and introduction into the work and they do not expect that graduates will get enough

knowledge for everyday work already during the study period. Generally private companies are more critical and expect more from graduates than public ones.

Referring to the needed skills of the graduates when applying for a job, it has to be emphasized, that in Slovenia as well as in other EU countries soft skills (project management, communication, time management, team work, economic, foreign language etc.) are more and more important, in particular in the private sector. These skills are necessary in all fields of work and sometimes they are even more important than professional knowledge. As an example, almost all of the work in the private enterprises is project oriented; without proper project management, communication skills, teamwork, there are no (expected) results. Basic knowledge of economics is needed in every project and foreign language is nowadays obligatory. The expectations of graduates as well as employers for the future development of surveying profession are further referring to the interdisciplinary work. We noticed that these expectations (already demands of society) are getting higher every day and it is very difficult for graduates and for the academic institutions to follow development of the labour market.

4.1 Graduates between studying programme and employers

Based on the presented researches on opinion of graduates and employers about the educational competences, we can say that graduates get enough of technical and expert knowledge but they do not get enough practice and soft skills. In Slovenia, only one month of practical work in the enterprise was obligatory during the study at the university level (and one semester at the higher professional level). However, we have to know that the educational competences are only part of the professional competences, which have to be developed lifelong. Students in Slovenia acquire practical and soft skills also by student work (summer job), which is widely supported also by the government. This may also be the reason for rather positive answer on graduates' skills from the employers in Slovenia. Nevertheless, the higher educational institutions have to follow the professional development on the international level and the needs of society.

4.2 Adjusting the study programmes to the needs of society

In the last few years almost all the higher educational institutions in Europe, that did not have the three tires higher educational system in the past, are being in the process of changing the study programmes according to the Bologna process. Bologna declaration forced higher educational institutions throughout EU to change their programmes, which has been also a great opportunity to adjust the programmes to the current guidelines of the profession and the needs of society. Fig.5 shows the triangle with important actors in the process of changing higher educational study programmes. In order to get as objective as possible overview of the current situation and the necessary changes it is necessary, that the higher educational institution (university, faculty) includes all levels of profession in discussion while renovating the study programme. In Slovenia, the Department of Geodesy, Faculty of Civil and Geodetic Engineering at the University of Ljubljana, did a lot of work to acquire the important information from main actors in the field of surveying before preparing the proposal and accepting the new programmes of surveying (geodesy) at the department. For this purpose, the Strategic Council was established, which was advisory body for the faculty in the process of changing the programme, considering the guidelines of Bologna declaration. The Strategic Council members were representatives

of the Surveying and Mapping Authority of the Republic of Slovenia, Professional Surveying Association, Chamber of surveying engineers and private enterprises.

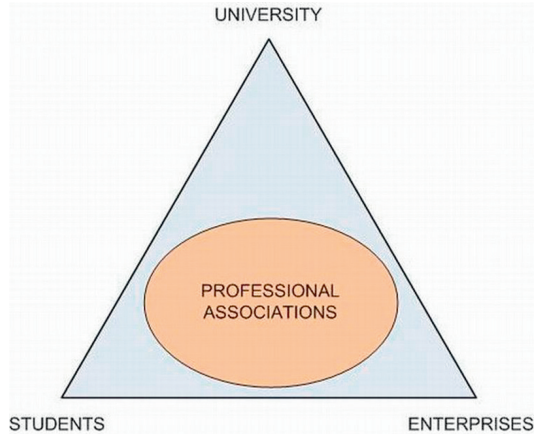


Fig. 4: Important actors for changing the programmes.

4.3 How can the enterprises influence the curriculum development

Cooperation between science (universities) and enterprises is an assurance for economy growth in all fields of work and surveying is not an exception. Because of this, enterprises should be actively involved in the process of changing the study programmes. Study programmes are not changing very often (however, the contents of each course are changing but this are not changes that influence on the study programmes as a whole) and every considerable change will not have immediate impact on labour market. This is the main reason, why every change is important for the long term development of the profession. In this aspect, a special support can be provided by the professional associations, which can coordinate the communication, support the exchange of ideas and following the ideas of all actors in the profession, prepare also some guidelines for the higher educational programmes in the future. In Slovenia, there are many possibilities for the enterprises to have direct or indirect influence on curriculum development; at least on the contents of the practical training programme within the framework of the higher education. The best way is a collaboration between professional association (for example in Slovenia we have Chamber of surveying engineers and Association of private enterprises) and the faculty.

Due to the fast development of the surveying profession and the extension of the surveying companies' fields of work, it is impossible to expect, that the higher education will ever "produce" graduates which will provide all the competences, needed in the enterprises. Sometimes the enterprises want to get some specific knowledge, which is a short term need, and the higher educational institutions should not response to such initiatives immediately by proposal of changing study programmes. Enterprises does not expect that either, because other approaches are much more appropriate for such needs such as life-long learning programmes, which are on the other side a challenge for the enterprises as well as for the higher educational institutions, who can organise the short training programmes for the particular topic. In Slovenia, there is still a wide space for developing this cooperation in the future, which can contribute to development of the professional skills of graduates by meeting demands of society.

5. Conclusions

In order to follow the needs of society, enterprises and graduates should play an important role in the process of changing higher educational study programmes in a certain field of profession. The higher educational institutions have to response to the market needs, not only with flexible study programmes but also with other kind of courses in the context of Lifelong Learning. The idea of establishing a Strategic Council for higher education in the field of surveying, where all the important actors (private, public, chamber) would take part in, is widely accepted in the Slovenian professional society, because of the advantages of such cooperation in the period of developing new study programmes in accordance with the Bologna declaration in the course of the last years.

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Contact

Andrej Mesner, Igea d.o.o., Kopraska 94, SI-1000 Ljubljana, Slovenia, e-mail: andrej.mesner@igea.si

Assist. Prof. Anka Liseč, PhD, University of Ljubljana, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Jamova 2, SI-1000 Ljubljana, Slovenia e-mail: anka.liseč@fgg.uni-lj.si

Senior Lect. Samo Drobne, MSc, University of Ljubljana, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Jamova 2, SI-1000 Ljubljana, Slovenia e-mail: samo.drobne@fgg.uni-lj.si