



Final Situation in Surveying Education in Turkey, and its Contradictions

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Abstract

As around the world, also in Turkey, with the impact of the globalization, there have been important changes and developments in engineering education, particularly surveying engineering education, in a period of which free circulation has become widespread and intensive efforts for the membership of the European Union have been made. There is no doubt that products and reflections of the developing and varying technology has seen in Turkey, too. The first civilian survey education was begun in 1949 at Yıldız Technical University in Istanbul in Turkey. Over the past six decades, the number of active education training departments has risen to eleven. In addition, five new departments have been established, and they are still preparing for the active education training.

It is vital to select suitable models, which provide integration between the world and Turkey, and include certain standards with the aspect of survey engineering by the affect of both increasing number of departments and increasing enrolled and graduated student numbers. Therefore, redoubling the quality of the education, tracking the current curriculum, increasing the mobility in education, developing the e-learning system, adopting the European Credit Transfer System (ECTS), leading the national and international accreditation studies have been conducted as listed respectively in several considerable subtitles. Accreditation is a developed method of the quality assurance of the social services with a systematic approach in several countries and sectors. In this point, accreditation is a significant means of obtaining reliability and continuity for these services. Educational accreditation is a type of quality assurance process under which services and operations of an educational institution or program are evaluated by an external body to determine if applicable standards are met.

Accreditation studies conducted in national and international areas were completed in some of our departments and, became sustainable. The other departments are continuing the national and international accreditation studies rapidly. Beside international accreditation studies, like conducted by ABET (Accreditation Board for Engineering and Technology) and EUR-ACE (European System for Accreditation of Engineering Education), in national aspect MUDEK (Engineering Education Program Evaluation and Accreditation Association) conducts national accreditation studies. In this contrary, ITU (Istanbul Technical University) which is one of the university lectured surveying engineering education, has obtained the ABET accreditation, and the other two universities; YTU and University of Selçuk has obtained MUDEK accreditation. At the same time, MUDEK conducts accreditation studies with EUR-ACE (European Accreditation of Engineering Programs).

Although some surveying departments have finished or still conduct accreditation studies in Turkey, some of them have not started these facilities yet. Furthermore, serious differentiations between these departments have been affecting our country's surveying education. The differentials emanate from physical infrastructure, device and hardware capacity, lecturer staff, divisions, students' quota. There is no equal distribution on these listed issues in universities. So, one cannot wait to take an equally distributed education outputs (graduates) from these education system. This will finally affect the profession and sector outputs.

In addition to the problems as mentioned above, unbalanced growth in surveying profession will change the supply demand balance. In spite of positive developments in engineering education because of the ABET or MUDEK standards and criteria, new opened departments without determination survey sector needs of survey engineer would make difficulties in the near future for our profession and our country. Especially, in terms of criteria listed above, the serious differentiations between departments will affect the education quality and graduates in terms of well qualification and standardization throughout the country.

Therefore, in this paper, change and development process of survey engineering education in Turkey from onrush to today is examined. Moreover, studies about integration to the developed world are mentioned. Furthermore, in this process, affirmative contributions of the system and also contradictions and missing sides of the survey education in Turkey will be emphasized.

Keywords: Surveying education, accreditation studies, ABET, MÜDEK

1. Introduction

Surveying education at the degree level was started to be given for the first time in Turkey upon the Department, which was called as Survey and

Cadastral Engineering in those days, was established in 1949 under administration of Yıldız Technical University due to the efforts of General Directorate of Land registration and Cadastre.

This was intended for graduating technical elements required for performing Turkey's cadastral affairs. The curriculum was intended for the targets of completion of cadastral works in the early years while it shifted due to increase in engineering projects such as dams, roads, bridges, tunnels etc, development and land agglomeration and large housing projects completed in the course of time in our nation. On the other hand, due to replacements of classic methods with electronic methods as a result of advances in technology and science, effective use of information and informatics technologies, increasing effects of space and satellite techniques on our profession, educational institutions have revised and rearranged their programs (curricula) for adapting to these changes occurred in the course of time in the light of these developments.

Rapid change and development process being experienced in the world and in Turkey has ensured that the curricula have been updated while our departments' names were changed as Geodesy and Photogrammetry Engineering

through Higher Education Law Code published in 1981 in Turkey. Discusses on the name of the profession have continued in Turkey just like around the world until today since that date.

Today, Geodesy and Photogrammetry Engineering education is being done in the departments existing in 11 universities in Turkey. Some of these departments present master's and doctoral degree programs also. Geodesy and Photogrammetry Engineering departments were established in five universities beside the mentioned universities; however, they have not accepted students yet. These newly founded departments are making preparation works due to deficiencies in lecturers and also physical deficiencies. The list of universities to give active and passive education is seen in Table 1.

Also, institutions exist in 4 universities offering only graduate programs beside undergraduate programs. These exist in METU (ODTÜ), Bosphorus University (Boğaziçi Üniversitesi), Gebze Advanced Technology Institution (Yüksek Teknoloji Enstitüsü) and Kültür University.

| No | University | Department | City | State |
|----|--------------------------------|-------------------------------------|----------------|---------|
| 1 | Yıldız Technical University | Dept. of Geodesy and Photogrammetry | İstanbul | active |
| 2 | Karadeniz Technical University | Dept. of Geodesy and Photogrammetry | Trabzon | active |
| 3 | İstanbul Technical University | Dept. of Geodesy and Photogrammetry | İstanbul | active |
| 4 | Selçuk University | Dept. of Geodesy and Photogrammetry | Konya | active |
| 5 | Zonguldak Karaelmas University | Dept. of Geodesy and Photogrammetry | Zonguldak | active |
| 6 | Gümüşhane University | Dept. of Geodesy and Photogrammetry | Gümüşhane | active |
| 7 | Ondokuzmayıs University | Dept. of Geodesy and Photogrammetry | Samsun | active |
| 8 | Afyon Kocatepe University | Dept. of Geodesy and Photogrammetry | Afyonkarahisar | active |
| 9 | Erciyes University | Dept. of Geodesy and Photogrammetry | Kayseri | active |
| 10 | Kocaeli University | Dept. of Geodesy and Photogrammetry | Kocaeli | active |
| 11 | Aksaray University | Dept. of Geodesy and Photogrammetry | Aksaray | active |
| 12 | Cumhuriyet University | Dept. of Geodesy and Photogrammetry | Sivas | passive |
| 13 | Hacettepe University | Dept. of Geodesy and Photogrammetry | Ankara | passive |
| 14 | Niğde University | Dept. of Geodesy and Photogrammetry | Niğde | passive |
| 15 | Harran University | Dept. of Geodesy and Photogrammetry | ŞanlıUrfa | passive |
| 16 | Pamukkale University | Dept. of Geodesy and Photogrammetry | Denizli | passive |

Table 1: Geodesy and Photogrammetry Engineering Departments in Turkey

Today, approximately 950 students obtain the right to study and are taught in Geodesy and Photogrammetry Engineering departments each year. The universities apply different curriculums. Although current professional developments are taken under consideration, these different lesson programs in different universities may be considered normal. However, deficiencies in lecturer and substructure are conspicuous at first sight in the newly founded departments. Different types of engineers are graduated with respect to quality in Turkey as a result of education given especially in the departments, which are not sufficient in physical substructure, instruments and equipments, laboratory and lecturers.

Therefore, in the recent years, especially the departments under administration of large and experienced universities have started accreditation efforts to increase quality of the education at the degree level in Geodesy and Photogrammetry Engineering, to follow current lesson programs, to increase mobility and to satisfy certain standards in education and they completed some of the accreditation works. In Table 2, number of the quotas of each university in Turkey can be seen. As mentioned and will be considered at the rest of the paper, the quotas of Geodesy and Photogrammetry engineering departments are very high in some of the universities, and it has affected directly to the quality of the graduated students.

The higher number quota means the less quality education.

2. Current Situation in Geodesy Engineering Education in Turkey

Educational problems in geodesy sector should be taken under consideration within a wide range including the education in senior schools, the education in undergraduate department, training-on-job and certification programs. Under this context, these problems should be taken under examination seriously, planning should be done and the plans should be executed under coordination.

However, new departments and programs are being opened with an approach increasing the existing problems by ignoring demands for educated human resources in the sector. A review is required on curricula, educative staff and their competence, physical substructure in the educative units and also relation between the educative units and the institutions in geodesy sector. Especially the efforts spent on higher education area are highlighted among these subjects so that most of the advantages acquired by the geodesy sector within the process lasting from the rise of the geodesy sector until today have been obtained due to undergraduate and graduate programs being offered by the universities in our nation.

| No | University | Overall Quota | |
|--------------|--------------------------------|---------------|--------------|
| | | 1. Education | 2. Education |
| 1 | Yıldız Technical University | 100 | 100 |
| 2 | Karadeniz Technical University | 80 | 80 |
| 3 | İstanbul Technical University | 70 | – |
| 4 | Selçuk University | 80 | 80 |
| 5 | Zonguldak Karaelmas University | 60 | – |
| 6 | Gümüşhane University | 40 | – |
| 7 | Ondokuzmayıs University | 50 | 50 |
| 8 | Afyon Kocatepe University | 50 | – |
| 9 | Erciyes University | 40 | – |
| 10 | Kocaeli University | 30 | – |
| 11 | Aksaray University | 30 | – |
| Total | | 630 | 310 |

Table 2: Year 2008 Quotas of Geodesy and Photogrammetry Engineering Departments in Turkey

2.1 Problems in Graduate Programs and Recommendations for Them

2.1.1 Quality and Accreditation

In this process in which globalization is affecting the whole of the world, quality and accreditation concepts, which is emphasized in engineering programs, also have high impact on geodesy programs. After both national and international accreditation principles and criteria were specified by different institutes and entities in different countries, our universities offering geodesy programs started to execute their works based on these principles and moreover, some of them have advanced significantly in this way.

Under this context, some universities are executing various works based on the accreditation programs of national "MÜDEK" and also international "ABET". Here, the important matter is to ensure that certain principles and criteria in education are fulfilled in our universities by executing these works in all departments offering geodesy programs in coordination.

The departments in Yıldız Technical University, Selçuk University and Karadeniz Technical University have started accreditation works of MÜDEK, which is a national accreditation program, as the first target to specify these principles and criteria. The department existing in YTU among these departments has acquired this national accreditation after passing many tests. The other two departments are still under assessment stage. On the other hand, Istanbul Technical University has fulfilled the international accreditation of ABET and made it sustainable. Various efforts are being spent for accreditation works in other departments also other than these departments.

2.1.2 Curricula

The lessons on the profession other than the basic engineering lessons enforced by YÖK (The Higher Education Board) are generally specified by the departments. We cannot say that, demands in the nation are considered sufficiently while specifying these lessons. It is seen that, curricula are produced according to the structures of the existing lecturers in the departments. However, basic science lessons, professional theoretical and practical lessons and social and cultural lessons required for a contemporary, scientific and qualified engineering program considering current conditions also should be taught sufficiently and at required levels.

In the recent years, program-producing efforts based on accreditation have become significant in the universities. Orientations of the universities in developed countries around the world are being followed in this process.

In our universities, mutual ECTS (European Credit Transfer and Accumulation System) credits were specified by making agreements with the universities existing in EU member states based on Socrates – Erasmus Program.

2.1.3 Lecturer Staff

Considering departments offering geodesy programs and accepting students in our country, some deficiencies and imbalances in lecturer staff are seen. Especially in the departments, which are newly founded and have just started education, academic staff is not sufficient from the point of view of number and serious assessments should be carried out about these departments. There is no doubt that, the subjects such as scientific research and development activities and becoming specialist on different topics are also very important beside educative efforts of the existing staff. Therefore, various measures should be taken today in these departments against potential problems, which would occur in the future.

The staff of the newly founded departments should be strengthened by providing encouraging conditions for research assistants, who acquired Ph.D. degrees. It will be an important resolution for the future and the quality of the profession that, students are not accepted to the insufficient departments from the point of view of academic staff and facilities.

2.1.4 Newly Founded Departments and Becoming a School

The number of the institutes offering Geodesy and Photogrammetry Engineering programs including the departments, which have just started education and those, which, have newly founded but not accepted students yet, has increased in the recent years in our nation. However, first national demands and then the demands in the geographic region in which the department will be founded for geodesy engineers should be considered while deciding about founding these departments. Therefore, the need for new departments offering undergraduate geodesy programs should be assessed in many aspects. The locations and location selections for the departments offering programs should be assessed seriously. Minimum technologic and physical

| University | Academic Staff | | | | | Total |
|--------------------------------|----------------|-----------------|------------------|----------|-------------|-------|
| | Prof.Dr. | Assoc.-Prof.Dr. | Assist.-Prof.Dr. | Lecturer | Res. Asist. | |
| Yıldız Technical University | 9 | 9 | 9 | – | 26 | 53 |
| Karadeniz Technical University | 7 | 3 | 6 | – | 16 | 32 |
| İstanbul Technical University | 15 | 11 | 5 | – | 22 | 53 |
| Selçuk University | 2 | 1 | 14 | – | 14 | 31 |
| Zonguldak Karaelmas University | 1 | 1 | 3 | 2 | 5 | 12 |
| Gümüşhane University | – | – | 2 | 1 | 2 | 5 |
| Ondokuzmayıs University | 1 | – | 5 | 1 | 2 | 9 |
| Afyon Kocatepe University | – | – | 4 | 1 | 3 | 8 |
| Erciyes University | – | 2 | 2 | – | 6 | 10 |
| Kocaeli University | 3 | – | 5 | – | – | 8 |
| Aksaray University | – | – | 5 | – | 2 | 7 |

Table 3: Academic staff in undergraduate education, 2008

substructure and lecturers required for the education should be determined.

The departments, which would be founded without providing the required substructure, equipment and instruments and also lecturer staff, would reduce the quality of the engineers to be graduated and also may cause irreversible damages our profession's interests and the future and also our nation.

Thus, the departments, which have been just founded and not started teaching yet, should be banned from accepting students until they complete their substructures and academic staffs. New departments should be opened and teaching should be performed based on principles and through a proper strategic planning for graduating qualified engineers.

3. The Result and Recommendations

There is no doubt that, the changed face of engineering profession, especially our profession, geodesy engineering due to the advances in science and technology is affecting geodesy programs in our nation in this process in which globalization is affecting the whole of the world. This developments and advances have positive effects on geodesy programs. However, some basic problems are becoming more significant in geodesy sector on teaching area. The most important problems are lack of coordination,

insufficient cooperation, less participation processes and in sufficient substructure facilities.

The first thing to overcome these problems and to eliminate potential troubles in the future is to make strategic planning. A board including presidents of the departments offering Geodesy and Photogrammetry Engineering programs in the universities may be established. This board may be enlarged with the heads of the main scientific branch.

Because the fact that “*investments on education do not yield results in short-term*” is known, strategic thinking will be required for the steps to be taken in the future. Focusing on the next period including 15-20 years and orienting to establish educative substructure for the future based on contemporary values should be the basic initial point.

The steps to be taken for education will be an indicator for what kind of future we design. We can obtain the future by the steps to be taken today about education. The problem is important and vital.

Each engineer candidate should have the following qualifications as a result of the existing undergraduate programs along with all the plans, which should be realized:

- The graduated students should have good command of a foreign language.

- Practicing should be emphasized in professional trainings of our students.
- The graduated students should be able to use any current professional software at a good degree.
- The graduated students should have information on law relating to our profession beside measurement and assessment techniques.
- The students should be educated not only from the professional point of view but also social point of view and should have a vision that ensures to make them able to undertake administrative positions in the future.
- The graduated students should have professional ethic.
- Obstacles in front of the specialization should be eliminated in our profession and specialized engineers on certain subjects should be graduated.

Especially, the specialization and certification efforts triggered by Geodesy and Cadastral Engineers' Chamber should be supported for specialization in the profession. Growing specialist engineers on certain matters is important for our profession.

References

- [1] *HKMO İstanbul şubesi (2002): İstanbul Raporu, "Mesleki Sorunların Tartışılması ve Geleceğe Yönelik Politikaların Belirlenmesi Kurultayı", 14–15 Aralık 2002, Ankara.*
- [1] *Köktürk, E., Çelik, R.N., Özlüdemir, M.T., Kılıç, G.:* "Harita Sektöründe Eğitim-Öğretim Sorununun Boyutları ve Çözüm Önerileri", TMMOB Harita ve Kadastro Mühendisleri Odası, 10. Türkiye Harita Bilimsel ve Teknik Kurultayı, 28 Mart – 1 Nisan 2005, Ankara.
- [1] *Mekik, Ç. (2005): "Dünyada Jeodezi ve Fotogrametri (Geomatik) Mühendisliği Eğitimi ve Sertifikasyon", Prof. Dr. Ekrem Ulsoy Anısına Eğitim Sempozyumu, 15 şubat 2005, Yıldız Teknik Üniversitesi, İstanbul.*
- [1] *Ö, Aydın:* "Jeodezi Ve Fotogrametri Mühendisliği Eğitimi, Mesleğimizin Misyon ve Vizyonu", TMMOB Harita ve Kadastro Mühendisleri Odası, 10. Türkiye Harita Bilimsel ve Teknik Kurultayı, 28 Mart – 1 Nisan 2005, Ankara.
- URL 1, www.yildiz.edu.tr
 URL 2, www.itu.edu.tr
 URL 3, www.selcuk.edu.tr
 URL 4, www.karaelmas.edu.tr
 URL 5, www.ktu.edu.tr
 URL 6, www.omu.edu.tr
 URL 7, www.aku.edu.tr
 URL 8, www.erciyes.edu.tr
 URL 9, www.kou.edu.tr
 URL 10, www.gyte.edu.tr
 URL 11, www.metu.edu.tr
 URL 12, www.boun.edu.tr

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