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# The Internationalisation of Higher Education: a New Stage of Individual Growth and University Development

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In this article, the author deals with the internationalisation of higher education in Lithuania during the 15-year period after the regaining of independence. Among other issues, it covers the study reforms that began immediately after the collapse of the communist regime and provided by the new, freely elected university community, including the author of this article, and difficulties and obstacles that hindered the implementation of reforms. Special attention is being given to a new stage in the internationalisation of higher education after launching the Bologna process and the contribution to the internationalisation of higher engineering education carried out by the UNESCO International Centre for Engineering Education (UICEE).

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## INTRODUCTION

The internationalisation of higher education is a natural result of the internationalisation of the world's material and intellectual development. Firstly, knowledge has no national boundaries. Secondly, the internationalisation of higher education is demanded by the economic development of society. The internationalisation of higher education makes it possible for people around the world to share a wider range of knowledge. Thirdly, the internationalisation of higher education is needed for the development of higher education itself. Internationalism has significant benefits; however, it can also have risks, the main one being that international opportunities are likely to be unevenly distributed at the national and individual levels [1].

Universities in every country have been engaged in face-to-face competition in a world market of education. In order to develop, strengthen their competitiveness and sometimes even to survive, universities should internationalise their university education. However, with the various opportunities also come some challenges, and the internationalisation of higher education has significant impacts on the development of higher education in all European countries, large and small, including Lithuania.

The internationalisation of higher education can cause a university to encompass an international feature, rather than being confined to one country. An

example may be the unity of two or more universities with different cultural backgrounds to make use of the joint advantages in capital, teaching personnel and experimental equipment to establish training programmes for undergraduates, graduates and even teachers, and to conduct scientific research. There is a definite move from the university being the academic *ivory tower* towards it becoming a training space for future entrepreneurs or policy-makers [2][3].

## UNIVERSITY REFORMS AND NEW POSSIBILITIES FOR INDIVIDUAL GROWTH

Lithuania is not rich enough in natural resources to equally compete with most technically and technologically advanced countries in the world. One of the few resources that it possesses is its people and their intellect. Since the time when Lithuania regained independence in 1991, higher education schools have been searching for new approaches to education.

Two main types of university education have been distinguished at a somewhat philosophical level: career oriented (engineering education and subject oriented) and classical university education. A technical university always faces a dilemma: is an engineer a person who is responsible with universal knowledge, or is an engineer a specific, narrow knowledge specialist?

After the implementation of the two-tier (bachelor-Master) study model in Lithuanian universities over 1991-1992, serious attention was paid to the content of study programmes. Universities have attained the right to change their curricula. Being in the position of Vice-Rector for Academic Affairs at Vilnius Gediminas Technical University (VGTU) in Vilnius, Lithuania, the author had the opportunity to influence running changes and shift the existing curricula from very specialised to more humanised, with an increased share of the humanities within the engineering education programmes. About 20% of the total study time is now devoted to non-technical subjects. The non-technical subjects in the engineering curricula are divided into the following three groups:

- Languages;
- Subjects related to health and healthy modes of life;
- Subjects connected to nature, sociology, humanities and art.

Over the last decade, the range of international contacts and the level of student/academic staff exchange have greatly expanded. Key European Union (EU) programmes (eg Tempus, Socrates, Leonardo da Vinci, Framework and others) have been catalytic factors that foster cooperation and help to improve the quality of education. The student exchange and research programmes have generated new possibilities for studies abroad and common international research. The participation of the Vilnius Gediminas Technical University in the TEMPUS programme has created the background for a future wide network of contacts with European universities. The first TEMPUS programme began at the then Vilnius Technical University in 1992. Until 1997, University had eight different (SJEP, MJEP, CM) programmes. The author was the institutional coordinator of, and a participant in, the following TEMPUS projects:

- Human resource and qualifications development in relation to present and future technological challenges in the transport sector;
- Aviaeducation;
- Integrated informational systems at academic libraries;
- The internationalisation of study programmes at four Baltic technical universities;
- Cooperation between universities and industry in Lithuania.

Participation in the Socrates programme has stimulated not only student exchange, but also the creation

and improvement of new programmes of international studies, teaching staff mobility and other forms of collaboration. The author has taken – and continues to take – an active part in different projects. The author was the institutional coordinator of the SOCRATES, Leonardo da Vinci and PHARE programmes, and actively participated in the following projects:

- SOCRATES: *Teaching and research in engineering in Europe*;
- PHARE: *Transparency of Academic Qualifications as a Gateway for Professionals' Free Movement in Europe*;
- Leonardo da Vinci:
  - *Diffusion of online company for training European students-DELFE*;
  - *Creating an observatory on Europe-wide TAQC (Transparency of Academic Qualifications and Competences) for catching the MOLE (Mobility of Labour in Europe) and filling the GAP (Generalized Academic Policy)*;
  - *Development of Programmes for the Training of European Level Welding Specialists*.

Recent years have shown that the fast growth of cooperation among the Baltic Sea regions and countries is a reality. The growing level of cooperation includes the broad mobility of human resources in the areas of engineering, management and business. It has become possible for seven technical universities from Sweden, Estonia, Latvia and Lithuania to create a consortium in science and technology. The future goal of this consortium is to create a virtual *Baltic Sea University of Science and Technology* that will comprise a number of universities from the Baltic Sea. The author is a standing member of this consortium and took active part in the planning and fulfilment of different activities.

One of the projects that has successfully run from 1998 is a common Master's degree programme called *Industrial Engineering and Management*. This programme has been successfully implemented in the Faculty of Mechanical Engineering at the VGTU, in which the author has the position of the head of the Materials Science and Welding Department.

The author's first work placement was made on 1960 after being accepted for a work placement at the Design Office of the Lithuanian National Economy Council. Designing systems for heating and ventilation was not an easy job for a beginner, but gradually the experience and knowledge in the design and testing

of manufactured and assembled systems at food processing, furniture and machine-building enterprises was acquired. The range of vision and self-confidence has increased, but the knowledge received while at college was not enough to design modern enterprises. Further studies at Kaunas Polytechnic Institute (1961-1967) served to determine a future in engineering. Students in their first and second years had a sandwich study system. In the morning, they attended lectures, but in the second part of the day, they worked at factories. Work at the factory was a good school of practical training.

At that time (1967-1970), research on alloyed cast iron was urgently needed for the largest synthetic cast iron factory in Lithuania, which produced cast iron from waste metal obtained from industrial enterprises and gathered metal scrap. This research became the background for the PhD thesis, *The influence of manganese, chromium, tungsten, aluminum and cooling rate on the structure of high carbon iron alloys*, which was defended at the Institute of Ferrous Metallurgy Dnepropetrovsk (Ukraine).

The course of further practical activity was simple: having been elected the Head of the Metal Technology Department at the Vilnius Civil Engineering Institute in 1986, the author was elected as Vice-Rector in 1990. In parallel to his administrative duties, there were also research and pedagogical activities. The conducted lectures were on subjects related to materials science, technologies of structural materials, design of welded structures, technology of fusion welding and thermal cutting, soldering and brazing, and polymers welding.

The research was associated with the thermo-mechanical deformation and heat treatment of high strength low alloy (HSLA) and cryogenic steels, the peculiarities of manufacturing welded joints, resistance and plasma welding of soft-magnetic materials, the technological peculiarities of diffusion welding of high nickel alloys with ferrites and alsilfers, the laser heat treatment and cutting of carbon and alloyed steels, hard facing of ferrous metals, development of electrical power sources for arc welding of non-ferrous alloys (aluminium, manganese, titanium) and high-alloy steels.

After the restoration of Lithuania's political independence and the fall of the iron curtain, new possibilities emerged to initiate collaborations with Western countries and improve professional skills. Internships at the higher education schools of Leuven (1993, Belgium), Glamorgan (1994) and Northern London (1996, UK) and Horsens (1994, Denmark) opened up new horizons and vision.

The results of investigations made at home and

foreign universities have been summarised in the monograph *Research on Weld Ability and Structure of Special Steels and Alloys* (1995) and applied in other books, including:

- *Plasma-Arc Welding, Cutting, Sputtering and Surface Deposition* (1988);
- *Special Methods of Welding* (1993);
- *Soldering and Brazing* (1993);
- *Welding and Cutting with Concentrated Energy Sources* (1988);
- *Investigation of Structure and Weld Ability of Special Purpose Steel and Non-Ferrous Alloys* (1995).

More than 130 scientific publications have been published by the author individually or with co-authors.

The obtained research results became the basis for compiling his Doctor Habilitatis thesis. Such research as under the title, *The Influence of Thermo Kinetic and Structural Processes on the Properties and Quality of Welded Joints* was successfully conducted in 1997. This research and associated pedagogical problems were demonstrated in over 120 papers presented in Paris, Stockholm, Copenhagen, Göteborg, Warsaw, Prague, Berlin, Magdeburg, Moscow, Minsk, Kiev, Omsk, Togliatti, Penza, Novokuzneck, Tashkent, Izhevsk, Komsomolsk on Amur, Sophia, Budapest, Kraków, Tallinn, Riga, Kaunas, Vilnius and other cities. Material from these reports may be found in various publications from European countries, Australia and the USA, in the English, Russian, German and Czech languages.

The title of Professor was granted to the author in 1998 and, in 2001, the author was invited to become a member of the Lithuanian Academy of Sciences. In 2004, the new area of activities, related to the duties of the Lithuanian Representative for the Coal and Steel Committee of the Research Directorate - General of European Commission, was added.

The author's professional memberships include the European Association of International Education, the European Society for Engineering Education (SEFI), the European Higher Education Society and the Alliance of Universities for Democracy (AUDEM), which gave wide possibilities for accumulating international cooperation, experience and the transfer of engaged know-how into the everyday life of the University. This experience was summarised in two books, namely: *The Reform and Development of Vilnius Gediminas Technical University* (1998, co-authored with E.K. Zavadskas) and *A Time of Challenge and University's Growth* (2002, co-authored with E.K.Zavadskas). In recent years,

three big international conferences chaired by the author, namely *Bologna Spirit in Two Tier Engineering Education Curricula Development* (SEFI, 2002), *Toward New Systems of Higher Education* (AUDEM, 2003) and *Mechatronic Systems and Materials* (2005) were organised in Vilnius.

Additionally, some time had to be devoted to contributing to the work processed by the Lithuanian academic computer network, LITNET, the National SOCRATES/ERASMUS committee, the editorial boards of the research journals, *Materials Science* and *Aviation*, the activities of the University Senate, etc.

## THE BOLOGNA PROCESS

The Bologna process aims at constructing a European Higher Education Area by 2010. At present, 40 European countries are working to meet the requirements of the European Higher Education Area. The uniformity of higher education systems is expected to increase the scope of student mobility. The EU mobility target of at least 20% of all students by 2010 is based on a common learning language (usually English), and freedom of movement of students and teaching staff across the national borders of the EU (see Figure 1).

At present, the Lithuanian higher education system is undergoing two major changes. Lithuania has stepped on the road to popularise college education and introduced a *binary system* of higher education.

Following the European Commission initiative, the Bologna Promoters Corps, which is funded by the European Commission, has been appointed in all Socrates Erasmus countries. The Bologna Promoters scheme is a *peer-to-peer* exercise. The main task of the Bologna Promoters is to assist higher education institutions with the following:

- The promotion and development of student and staff mobility;
- The implementation of the European Credit Transfer System (ECTS);
- The preparation for the ECTS label;
- The implementation of the diploma supplement;
- The preparation for the diploma supplement label;
- General information about the Bologna Process.

In Lithuania, the six promoters, including the author, are comprised of academics, administrators and a student representative (specifically two Vice-Rectors, Vice-Dean, ECTS/DS national coordinator, representative of a non-university higher education institution and one student), who have been chosen because of their in-depth knowledge in quality assurance, the qualifications frameworks and recognition issues in higher education.

The promoters have provided counselling to higher education institutions on the three Bologna priorities as defined by the Ministers in Berlin, which are as follows:

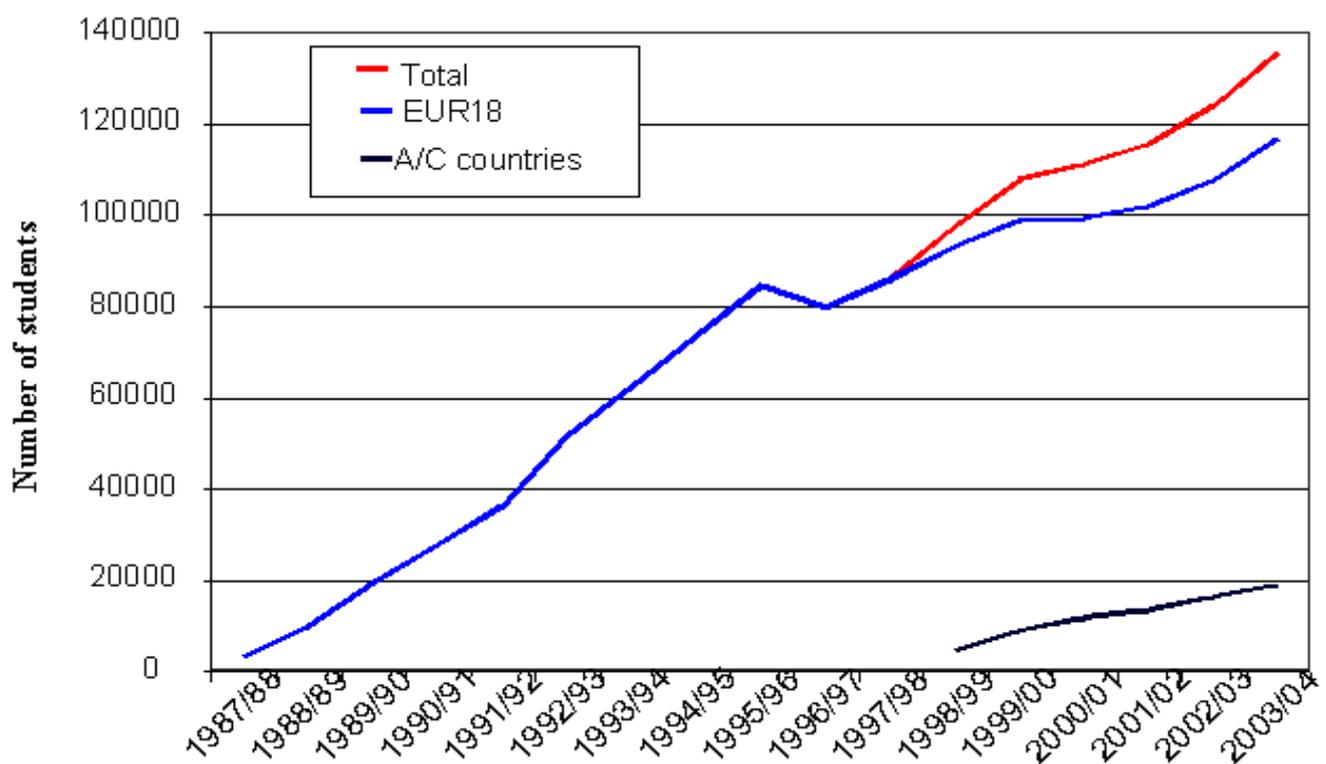


Figure 1: Erasmus student mobility 1987/1988-2003/2004.

- Quality assurance (internal and external);
- The three-cycle system (curricular reform, qualification frameworks and tuning);
- Recognition (ECTS, diploma supplement, EUROPASS and the Lisbon Recognition Convention).

After the Berlin summit of 2003, the third tier-doctoral studies was added to the former two. Joint degrees must receive legal recognition in all EU states. Joint degrees closely relate to international cooperation in quality assurance and the joint development of curricula among higher education institutions in different countries.

The following are beneficiaries of the Bologna process:

- *Students*: the expansion of minds and opportunities;
- *Academics*: the development of research and teaching networks;
- *Institutions*: enhanced reputation and institutional cooperation;
- *Europe*: encouraged Bologna reforms, response to professional development needs, European citizenship and intercultural understanding; global recognition of European strengths.

## INTERNATIONALISATION AND THE UICEE

A large contribution to the internationalisation of higher education has been – and continues to be – carried out by the UNESCO International Centre for Engineering Education (UICEE) headed by Professor Zenon J. Pudlowski. From 1997, the UICEE has the status of a full UNESCO centre in practice. The signing of an agreement by the then Director-General of UNESCO, Dr Federico Mayor, is seen as recognition by UNESCO of the Centre's achievements and demonstrates UNESCO's increasing commitment to engineering and technology education. It ensures that the UICEE can continue its important work for the benefit of the entire global engineering community [4].

The UICEE, the world's first and sole centre of its kind, was developed in accordance with the principle of global solidarity. The key objective in the Centre's operation is the sharing of knowledge and expertise on engineering education. The sharing of knowledge and expertise in engineering education is provided through international global and regional conferences and seminars. Indeed, the regional and global approach has proved to be a very successful UICEE decision, with 18 Partner institutional members and the UICEE European Headquarters (UICEE-EHQ)

located in Wismar, Germany. It was the result of a very important activity carried out by UICEE authorities.

One of the best series of UICEE regional seminars were the regular Baltic Region Seminars on Engineering Education. The *1<sup>st</sup> Baltic Region Seminar on Engineering Education* was organised by the UICEE and staged Vilnius in 1997, with the most recent one (the 9<sup>th</sup>) held in Gdynia, Poland (2006). The UICEE Seminar organised at the then Vilnius Technical University offered the opportunity for Lithuanian higher education institutions to communicate with people from all world, not only from European countries. UICEE-run and co-sponsored conferences and seminars are famous for worldwide participation, regularity and venue geography, including: Australia (Cairns, Hobart, Melbourne, Sydney), Asia (Barnaul, Bangkok, Changhua, Mumbai, Taipei and Muscat), Africa (Algiers), Europe (Copenhagen, Gdynia, Glasgow, Göteborg, Kaunas, Kraków, Mannheim, Pavia, Riga, St Petersburg, Wismar, etc) and Latin America (Puebla, Kingston).

Conference and seminar proceedings, two regularly issued journals (the *Global Journal of Engineering Education* and the *World Transactions on Engineering and Technology Education*, both with Prof. Z.J. Pudlowski as Editor-in-Chief), present an informational space for spreading advanced ideas, internationalisation and the worldwide discussion of people involved in engineering education. The dynamics of UICEE-run activities provides the best road map, as shown in its motto *Serving the International Engineering Community*. The VGTU and, indeed, the author are proud to be a part of this international community, and contribute to its achievements.

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## BIOGRAPHY



Professor Dr Habil. Algirdas Vaclovas Valiulis was born in Vilnius, Lithuania in 1943. In 1967, he was awarded a Mechanical Engineer Diploma and, in 1974, he defended his PhD thesis. He was awarded his Doctor Habilitus degree in 1997. Since 1998, he has been a professor and

an expert member of the Lithuanian Academy of Science.

Prof. Valiulis teaches fusion welding technology and equipment for ferrous and non-ferrous metals and polymers, materials science, soldering and brazing. His research interests are in arc, resistance, lasers, diffusion welding and the heat treatment of ferrous metals, as well as the curriculum development of study programmes.

Since 1990, he is a vice-rector of Vilnius

Gediminas Technical University, Vilnius, Lithuania, and head of the Materials Science and Welding Department (since 2001).

He is the author of over 250 research, methodological, scientific and study organisation publications, including several books and textbooks, many study guides and manuals. He has presented over 100 papers at international conferences. Prof. Valiulis is a Member of the European Society for Engineering Education, the European Association for International Education, a European Higher Education Society, the Universities Consortium in Science and Technology (BALTECH), a national representative for Lithuania in the European Society for Engineering Education and the European Commission Committee for Coal and Steel, and is a member of the EC Bologna promoters team.

In 2000, he was awarded the UICEE Silver Badge of Honour for *...distinguished contributions to engineering education, outstanding achievements in the globalisation of engineering education through the activities of the Centre, and, in particular, for remarkable service to the UICEE.*