Cross-Cultural Communication in Engineering Education

E. Chojnacka & T. Saryusz-Wolski

The Technical University of Lodz, Lodz, Poland

B. Macukow

Warsaw University of Technology, Warszawa, Poland

A. Andersen

The Engineering College of Copenhagen, Copenhagen, Denmark

Keywords: Internationalisation of Education, International Student Exchange, Education Sans Frontier, Intercultural Teamwork

ABSTRACT: The globalisation of the engineering profession requires of the graduates good skills in intercultural communication. European activities in internationalisation of education and particularly international student exchange help to develop needed skills and abilities. Our experience in exchange of students has demonstrated that even a short period of study abroad offers the opportunity not only to acquire different knowledge and to gain professional experience, but also to learn foreign culture, develop cross-cultural understanding as well as get familiar with different teaching methods, different requirements, and generally different education system. In countries like Poland and Denmark, with teaching in seldom spoken languages special initiatives or concepts are necessary to support student exchange and attract foreign students. In this paper the special initiatives at the Warsaw University of Technology, the Technical University of Lodz and the Engineering College of Copenhagen are described.

1 ENGINEERING EDUCATION SANS FRONTIER

It is a fact that thanks to the development of technologies, means of communication and telecommunication (e.g. Internet), as well as thanks to the recent political changes the world has become a much smaller and much more common place. The shrinking of the distances can be observed especially in Europe, which gets more and more united by unification of economical, legal and monetary systems.

At many conferences the identity sign is not a nationality but a membership in an international concern present on the market of most countries. The notion “citizen of the world” concerns the increasing group of people.

The process of formal borders disappearance also refers to education. Besides traditional universities or within them a growing number of institutions appear having the words *‘European’*, *‘Open’*, or *‘International’* in their names. These tendencies inevitably lead to the necessity for the higher education institutions not only to be open to the needs of their students but also to take into account their international character and the fact that young people will want to study at a few different universities in various countries.

The educational systems must take into consideration the development of international contacts at the same time preserving their traditions as well as their national and cultural distinction. In or-

der to fulfil these demands it is necessary, among others, to gain ability to work with people representing various countries and cultures, while greater openness and universality of the universities' activities will make their character more European or even global.

2 WHERE ARE ENGINEERING CARRIERS GOING?

Engineers of tomorrow will need more than technical skills. They must be prepared to act in international environment. In the time of the full globalisation of industry and trade, firms have become international organisations. Thus they need specialists not only equipped with professional knowledge but also with other qualities indispensable for proper operation in modern society. A graduate of today needs additional skills: must be able to establish contacts easily, have negotiation skills and be able to work in groups, be flexible and easily adapt to various conditions, and be prepared for acting on the international labour market. As you can see, the educational process of today must take into consideration also the development of public, social and cultural qualities.

In the context of international cooperation it is equally important to possess both professional knowledge and certain features necessary for good functioning of the cooperation and at the same time developed thanks to it. Thus higher education must provide the graduate with knowledge on broadly understood rules and methods of communicating. In the process of studies a tolerant person who is not a "prisoner" of his/her own culture must be educated. Such a person takes up a job in multi-national groups without any problems, has appropriate knowledge and ability to compare and apply various international standards. Also fluency in foreign languages ought to be considered equally significant as the knowledge of specialist subject areas.

3 WHAT WE ARE DOING – A CASE STUDY

The authors of the paper represent two Polish universities: the Technical University of Lodz and the Warsaw University of Technology, and one Danish university: the Engineering College of Copenhagen. Special attention is paid in these institutions to the internationalisation of education and the development of cross-cultural communication. Polish universities realise this task through running studies in foreign languages, at WUT within the Center for English-medium Studies (CEmS) and at TUL within the International Faculty of Engineering (IFE). At the Engineering College of Copenhagen an international semester called European Project Semester (EPS) has been developed.

The cooperation of the above universities has a few years history and has been developing under joint European programmes (Tempus, Socrates), as well as in the form of individual and team projects (EPS). The universities see the cooperation as the way to develop internationalisation of education, which in turn will enable educating graduates prepared for functioning on the European labour market.

For over five years of CEmS, IFE and EPS operation we have gathered a lot of experience. If everybody is convinced about the necessity to run international cooperation, the meaning of international environment for the general development of educational systems, cross-cultural communications and personal skills is not always fully realised.

Below we present a few remarks on the influence of cross-cultural communications on engineering education.

Going for a period of studies to a university abroad is not only for gaining knowledge. On coming back from the international studies CEmS and IFE students stress the fact that getting acquainted with other culture, other teaching and courses organising methods, or people representing different mentality and habits has a great meaning for their personal development. Besides broadening their mind, after coming back to their home university, the students immediately start comparing what 'was there' to what 'is here'. The result of the comparisons is the question '*why?*' posed more and more often, and proposals of changes, which very often enable improving the quality of education and the process of teaching and permit to make it more attractive.

Over ten-year experiences of Erasmus programme, and then of Erasmus/Socrates and Tempus programme prove that direct student participation in international exchange, except for some extra cases, concerns maximum a few percent of the general number of students. The internationalisation of education should apply to much larger group of students, so it is of a great significance also for these students who stay at their university. It is necessary to enable them acting in international university environment and participating in cross-cultural communication. It refers to international students groups as well as to international academic staff.

It is clear from WUT and TUL experiences that receiving foreign students has a vital meaning for university. Besides academic aspects also organisational aspects are very important here, especially as regards the quality of teaching.

Foreign students, used to much more openness and to teaching oriented on individual contact of a staff member with a student, play motivating role for introducing positive changes in customs and ways of acting accepted at our universities.

Staff exchange enables acquiring different perspective on professional skills. It permits to compare and evaluate student – staff relations as well as ways of delivering classes and examining. Such mutual penetration of international experiences consequently leads to changes in the style of work, and as regards teaching and science it often contributes to new courses formation (also the courses delivered by international staff), to producing new handbooks, new research directions and new dissertations.

A condition for introducing internationalisation at a technical university in a country of a seldom spoken language is to start teaching in one of the most wide-spread languages, especially in English.

For our three centres offering education in foreign languages, the fact of inviting lecturers from abroad, besides all the benefits mentioned above, is also important for some other reasons. Students have a chance to be exposed to various ‘versions’ of a foreign language with different pronunciation and vocabulary.

The very idea of teaching in foreign languages (mainly in English), besides giving professional benefits, aims at equipping the engineer with the knowledge of appropriate technical terminology. The graduates, who studied their whole programme in English and gained experience in international environment are extremely competitive on the labour market to those who learnt foreign language only by attending language courses. They are especially sought-after by large international companies operating on a given market. Their strong point is the fact that they join professionalism with perfect knowledge of foreign languages and very good orientation in the specificity of local conditions. Their additional trump is the practice gained in other countries and universities as well as the ability to work in multi-national and multi-language teams.

One of the ways of developing professional and personal qualities is students’ participation in team projects, especially in International Semesters realised in multi-national teams. An international semester at the Engineering College of Copenhagen was started in 1995. The main aim of this semester called European Project Semester is to train engineering students from different countries to work together in cross-cultural and multidisciplinary project groups. They work together to execute an integrated engineering – design – and – business project. Each international team is a group of four to six students in their third year in university. A major part of the project work is derived from the students own planning of the project from beginning to the end. To break down barriers and to promote a common approach, a formally taught section, a number of short intensive courses covering some background subjects are included in the project. EPS has the general view that design is a multidisciplinary activity, known as Integrated Engineering, which requires a collective effort of specialists with different kind of expertise. Working in an Integrated Engineering context emphasises the development of personal competencies, especially the ability to work and communicate within groups. It also involves the inter-related work of several disciplines, such as mechanical, electronic, materials, marketing and export engineering, i.e. – business and technology.

Teamwork plays a vital role in the development and overall success of any project. However within the context of the EPS, teamwork is even more important because of the international nature of each team. New barriers are introduced, such as language and cultural difficulties. With the peo-

ple from different countries in the same group, it is important to break down the existing barriers by continually communicating and interacting with each other.

Projects done on EPS are learning and teaching methods by which new material and competencies may be introduced and are not just an opportunity to practice what has been previously taught.

Although project based learning has been developing at TUL and WUT for a long time, regular projects are usually prepared individually, and this method does not dominate in the teaching process. Our experiences gained while cooperating with the Engineering College of Copenhagen under European Project Semester motivated the Technical University of Lodz to organise a similar enterprise within the International Faculty of Engineering. The animators of this venture expect various benefits. First of all they expect that the university educational offer will be thus more attractive for international students, which will in turn contribute to balancing of proportions in student exchange. It will also enable working in international students groups and practising cross-cultural communication to a certain group of students of the home university.

4 CONCLUSON

Cooperation in international groups, no matter if they are concentrated around a specially prepared project or if they result from contacts taking place during regular studies, creates opportunities for more than just gathering knowledge. The time spent in a multi-cultural environment is a source of numerous benefits. Cultural benefits from the international exchange can be considered equally important as the academic ones.

International cooperation and cross-cultural joint activities develop personal qualities, make contacts establishing easier and teach living and working with others.

A number of benefits from the students work in international groups can be enumerated here:

- Greater openness and flexibility in acting and decision making,
- Developing communication qualities and skills, which makes it easier for future graduates to sell out on the labour market
- Acquiring different motivation to study
- Developing self-reliance, self-confidence, and high self-esteem

International projects also enable getting acquainted and understanding of:

- the aims and needs characteristic of different countries
- different approaches to the teacher – student relation
- different approaches not only to the problems of the students independence but also to their rights and duties
- various styles of teaching and learning
- different styles of teaching process realizing and of university management
- various solutions and assessments of the same situation

Additionally work in international groups also:

- Motivates students and enables them to identify themselves as engineers
- Provides opportunities for learning in a multi-disciplinary and cross-cultural environment
- Develops the ability to work cooperatively as a member of a team
- Includes group dynamics and human interaction

5 REFERENCES

Andersen, A.J. 1997. *International teamwork with Perspectives*, International Conference on Project Work in University Studies, Roskilde University.

Andersen, A.J. & Fogh, V. 1998. *International Student Teamwork in Engineering Education*, SEFI Annual Conf. Helsinki: 119-125.

Chojnacka, E. & Macukow, B. 1999. *Quality Management in Engineering Education,* SEFI Annual Conf. Winterthur and Zurich: 123-128.
Chojnacka, E., Jezierski, E. & Saryusz-Wolski, T. 1999. *The Project of the Education Quality Assurance System for the Technical University of Lodz*, Technical University of Lodz, Tempus JEP 13117 Report, Lodz.
DeWinter, Urbain J. (ed.). 1996. *Internationalisation and Quality Assurance*, EAIE Occasional Paper 10, EAIE Amsterdam.
Krasniewski, A., Macukow, B. & Witkowski, M. 1999. *The Project of the Quality Assurance System at the Warsaw University of Technology*, Warsaw University of Technology, Tempus JEP 13117 Report, Waszawa.
Moltoft, J., et al. 1993. *Quality and quality management in engineering education with reference to the ISO-9000 standards*, DTU Reports.
Saryusz-Wolski, T. Chojnacka, E. & Macukow, B. 1995. *Quality and International Cooperation in Engineering Education,* SEFI Annual Conf. Helsinki: 263-267.
Saryusz-Wolski, T., Chojnacka, E. & Macukow, B. 1997. *Some Concepts of Education Quality Improvement*, Technical University of Lodz/ Warsaw University of Technology, Tempus JEP 9170 Report.