

# ENGINEERING EDUCATION AND THE ROLE OF HUMAN DISCIPLINES

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**Abstract** <sup>¾</sup> *The needs of industry are concentrated on the knowledge and skills of engineers including the communication skills and ethic solution problems. The first theme of the contribution is the position, sense and content of ethics as the option course in engineering education at the Faculty of Operation and Economics of Transport and Communication, University of Zilina, Slovak Republic. The ethics is the basis for many engineer decisions. The second theme is the communication and the possibilities for education of communication in engineering education. This is the problem of understanding of the importance of a good communication - oral, verbal, etc. between engineers and another professions or citizens. Both disciplines are very important for success of engineers, firms and industry etc..*

**Index Terms** <sup>¾</sup> *human disciplines, knowledge and skills, communication, ethics.*

## INTRODUCTION

The mission of the universities by the Slovak higher education law [1] is to develop the harmonious personality, the wisdom, and the welfare for the people and also to contribute to the development and improvement of the whole society. This declaration includes three points - education, research & development and contacts with practice - and relations among them. It reflects the changes of environment and evokes the new tasks resulting from the current processes:

- in relation with pre-accession strategy of Slovak Republic, Bologna declaration and new Slovak higher education law no. 131/2002 [1,2]
- in relation with processes of convergence (Technical convergence causes an enlargement of know-how and finance resources which can not be realized by single enterprises. This leads to cooperation, alliances and fusions of different companies with no regard of national borders.),
- in relation with new tendencies in engineering education and in the special areas – transport, information and communication technologies, changes of market, policy, technology, etc.

The tasks include new rules and new deals for all players - Universities, research institutions, industry.

Universities have been suppliers of engineering education in the classic mission sense, now they are the centers of education – not only engineering education, but the life-long education, they are the centers of research and development and the place for start up firms. And so we are allowed to change the system of education, curriculum, subjects, methodology of education, the lines among all players or partners.

The education at the engineering faculties has been dominantly orientated on the science and exact knowledge. This is the reason in the context of environment changes why it is necessary to include to the curriculum the sense of development of moral, ethic standards and to communicate between “hard” and “soft” knowledge, etc.

Just the social competencies are very important in the most professions and their importance is growing with the rank in the enterprise hierarchy. If the professional skills of the employee are sufficient, e.g. hard knowledge and skills, than on the higher rank are put another requirements on him/her related with soft skills and knowledge. The social competencies include: communication skills, crisis management, styles of management, ability to motivate oneself and also another people etc.

In this occasion it is important to perceive the discussions about the profile, about the content of engineering education not only in The Slovak Republic but also in the world.

Discussions about study profiles of technical university graduates resulted in acceptance of two significant documents of European and worldwide prominence [2],[3]. Present-day professional public has no doubts that technical university students have to be given the knowledge from non-technical domains, e.g. in the courses such as philosophy, economy, sociology, ethics, aesthetics, law etc. This results from the fact that a representative of technical intelligence on the edge of the 3<sup>d</sup> millennium has to be flexible, creative and responsible for consequences of his/her doings. In addition the new social-economic conditions, especially those in the post-socialist countries, ask for a qualitatively new generation of technical specialists and professionals that will cope with the latest technical and technological trends and will be successful in management of business subjects.

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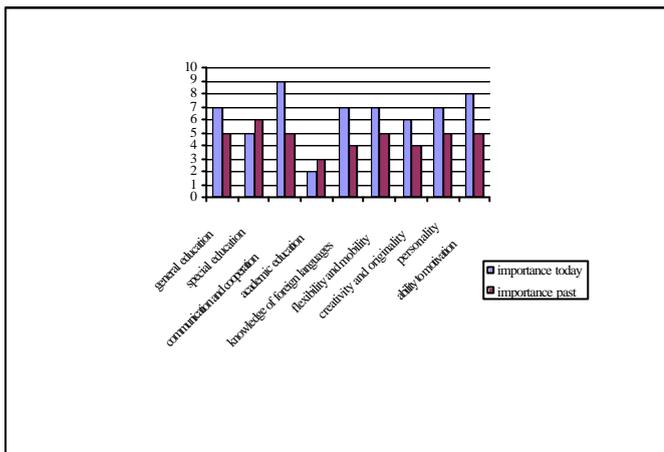


Fig. 1  
Importance of managerial competencies

At the University of Zilina, The Slovak Republic, we try to include the human disciplines to the classic engineering courses. Among the disciplines preferable by students we can include business ethics and communication.

### ETHICS

Among relatively new and young academic disciplines that appeared in the Slovak Republic during last decade the *business ethics* has obtained a sound position. Results from the introduction of some university teachers - humanists cannot be generalized yet but it is clear that the business ethics enables and helps the graduates [4, 5]:

- To be informed of many different ethical approaches used when solving ethical problems of practical life,
- To distinguish an ethically correct behavior from the unethical one and to be ethical and socially responsible,
- To form orientation of values in a sense of searching for the social good and well-being,
- To seek optimal ethical solutions for all the concerned subjects,
- To apply ethical principles in the business field, the field of technical engineering etc.

From the viewpoint of everyday needs it is sufficient amount of information and scientific knowledge on the base of which the graduates can think independently about themselves, their position in human society, their social responsibilities (not only for economic results of the country but the world around). This is not negligible.

Besides successfulness of transformation processes realized in post-socialist or transition economy countries will depend on the new management and its behavior.

Obviously, the business ethics won't perform wonders that solve the problems of mankind. It is only one of

possible tools used to humanize the educational process at technical universities. A chance given by the business ethics should be utilized. Seeking ethical relations in everyday life (especially in the economic one) forces the graduates to think over consequences of their activities and accept personal and moral responsibility for their doing on levels of the business ethics:

- On the micro-level (as a man, individual, entrepreneur, scientist etc.),
- On the mezzo-level (as a member of scientific teams, employee etc.),
- On the macro-level (as citizen of a certain nation, a member of a political party or movement etc.),
- On the global level (as a member of contemporary human civilization).

The business ethics can be considered an applied ethics that breaks the bounds of business relations. It also affects human relation to the nature, environment and future human generations.

### COMMUNICATION

The graduates of the technical universities are the ones who are expected to know how to manage working collectives, how to be active in the areas of research, development, production, marketing, sales, logistics, innovations, finances, etc.

The communication in practice has become a part of managing processes. It is developing unceasingly, especially its technical way of use (the communication through the computer, the Internet, etc.). We can see that the graduates are required to have a very good ability to communicate.

Nowadays, the right and fast information is demanded as well as its processing and correct interpretation in a short period of time. To have a high quality information and to know how to work with it involve [6]:

- The fast adaptation to a new environment
- The constructive thinking and designing
- The active use of the information
- The effective communication with other colleagues

Every university graduate should show good qualities of his/her personality in his/her working environment, know how to get on well with his/her colleagues by precise speech and argumentation. There can be seen the importance of the knowledge of the communication. Every creative activity provides various situations. That is why the students are learning theoretical basics needed for application in practice through the university lectures first.

Exercises are designed to teach them how to solve standard, typical situations, problem situation, through the analysis of video examples.

Students then get some space to create their own approach and independence. Teaching of the communication leads students to a development of their own personality and enables them to communicate with different kinds of people on all levels during the building of their careers, so they can

force their own opinions and decisions. That can contribute to an effective work. Training in the communication area brings possibility of an easy, open and honest understanding.

The culture of the linguistic communication is connected to the ability to express us correctly. The students are trained to recognize professional indications or a verbal expression, to speak clearly, briefly and distinctly. During the exercises, we are focused on the training of self-confidence, together with a tone (voice). Many people are grateful for their success to the impression left behind by the use of their voice. Also mutual sympathy or difference in a work team is a result of the verbal expression. Human linguistic communication is changing constantly and is very complicated. Who knows how to use it right, is making his/her personality better as well as his expression.

One of the most common techniques of the verbal communication is a dialogue. Using that, the students take the preparation through the practical exercises, where the goal is to teach them rules of leading the dialog successfully:

- Making clear what is the subject of the dialogue
- Realizing the way of explaining the subject
- Knowing what kind of person we are going to talk to
- Having an idea about the length of the dialogue, etc.

While having a dialogue we should also know the differences in the communication with men and women.

After the students of our university master the verbal communication, they are taught to recognize certain aspects of the body language, non-verbal communication. That means knowing how to select information according to the partners' reactions.

Skills in the fields of understanding signals in non-verbal communication provide a valuable advice on learning of a self-confident presentation. The natural behavior is important in work relationships compared to the pretending and using all sorts of different tricks. In every case, knowledge of the body-language signals is an advantage, because it enables us to realize useful work with people.

Nowadays, the specialized knowledge is not enough for an independent work. We also need ability to lead and manage people, to know how to understand them and encourage them, so they can show a result. Knowledge in the communication field can upgrade work with people to a higher level and to guide the work towards the best results.

### CONCLUSION

Finally, we'd like to express our hope that this new and young academic discipline will have a positive influence on education of technical intelligence for the 21<sup>st</sup> century and will get mass support in everyday life. The citizens, participants in the "knowledge society" or "information society" have to develop competence in handling technical equipment and must be in the position to judge the reliability and seriousness of information sources for their own further private and business life. In this context it is necessary to

accelerate the development of students ability in ethics, communication, philosophy, foreign languages etc. or "soft" competencies of students.

The objective of our restructuring process both the study programmes and subjects, both the system of education at the University of Zilina in the Slovak Republic is to prepare better the future bachelors, engineers, and doctors and to perceive the new requirements and new demands on the labour market.

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