

ENGINEERING PEDAGOGY AS A PART OF EDUCATION AT THE SLOVAK UNIVERSITY OF TECHNOLOGY

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Abstract: Article deals with teacher training of engineers, the IGIP (Internationale Gesellschaft für Ingenieulpädagogik/International Society for Engineering Pedagogy) National Group and IGIP Slovak National Monitoring Committee establishment, their role, orientation and development. Authors make an overview on current and prospective activities in the field at the Slovak University of Technology in Bratislava.

Key words: Complementary teacher training of engineers, university course, engineering pedagogy, research work, PhD. study IGIP register and index.

1. INTRODUCTION

The science and technology progress, which intensively pervades all areas of human life, expects sufficient training of young generation of engineers. Especially those of them, who will directly deal with technology development, will have a specific status and position in society. The present experience and future demands anticipate university teachers to achieve not only high professional level, but also pedagogical proficiency.

Pedagogical education of engineers was established in Slovakia in 1964, when the Department of Pedagogy of the Slovak University of Technology in Bratislava launched pedagogical study, compulsory for those engineers, who were teaching technical subjects at secondary schools. It was completed by state exams. Later on the Department started organizing the three semester complementary course of university pedagogy concluded by final colloquium.

2. ENGINEERING PEDAGOGY DEVELOPMENT

The systems approach, which expects defining engineering pedagogy concept, subject, sources and relation to other scientific disciplines, is a prerequisite for understanding its issues. *Engineering pedagogy* is an interdisciplinary science transforming knowledge of pedagogical theory and practice into technical sciences with a purpose of increasing didactic efficiency of engineering instructional process.

The subject of engineering pedagogy is training of engineers – teachers of technical subjects. “Training” is understood there in wider sense, although engineering pedagogy concentrates particularly on didactics, i.e. educational issues.

The content of engineering pedagogy includes especially the following key areas:

- introduction into methodology of technical sciences;
- role and function of an engineer in society;
- the university study characteristics;
- relation of engineering pedagogy to technology;
- role of didactics in engineering study;
- institutions of engineering pedagogy.

Engineering pedagogy is supported by theoretical knowledge of various scientific branches, but also by pedagogical and professional practice. There are the following sources of engineering pedagogy:

- humanities (psychology, pedagogy, etc.);
- social sciences (sociology, ecology, etc.);
- natural sciences (mathematics, physics, chemistry, biology, etc.) ;
- technical sciences (architecture, mining, electrical engineering, chemical technology, civil engineering, mechanical engineering, etc.);
- other sciences (informatics, cybernetics, theory of systems, etc);
- production and pedagogical practice. (DRIENSKY, D. 2006)

See the table 1.

Engineering pedagogy is relatively young scientific discipline appearing upon societal requirements considering specific attributes of technical education. Both its content and methodology are based on related disciplines as the sources, but later on enriching and developing them by its own experience and theoretical knowledge. Relation of engineering

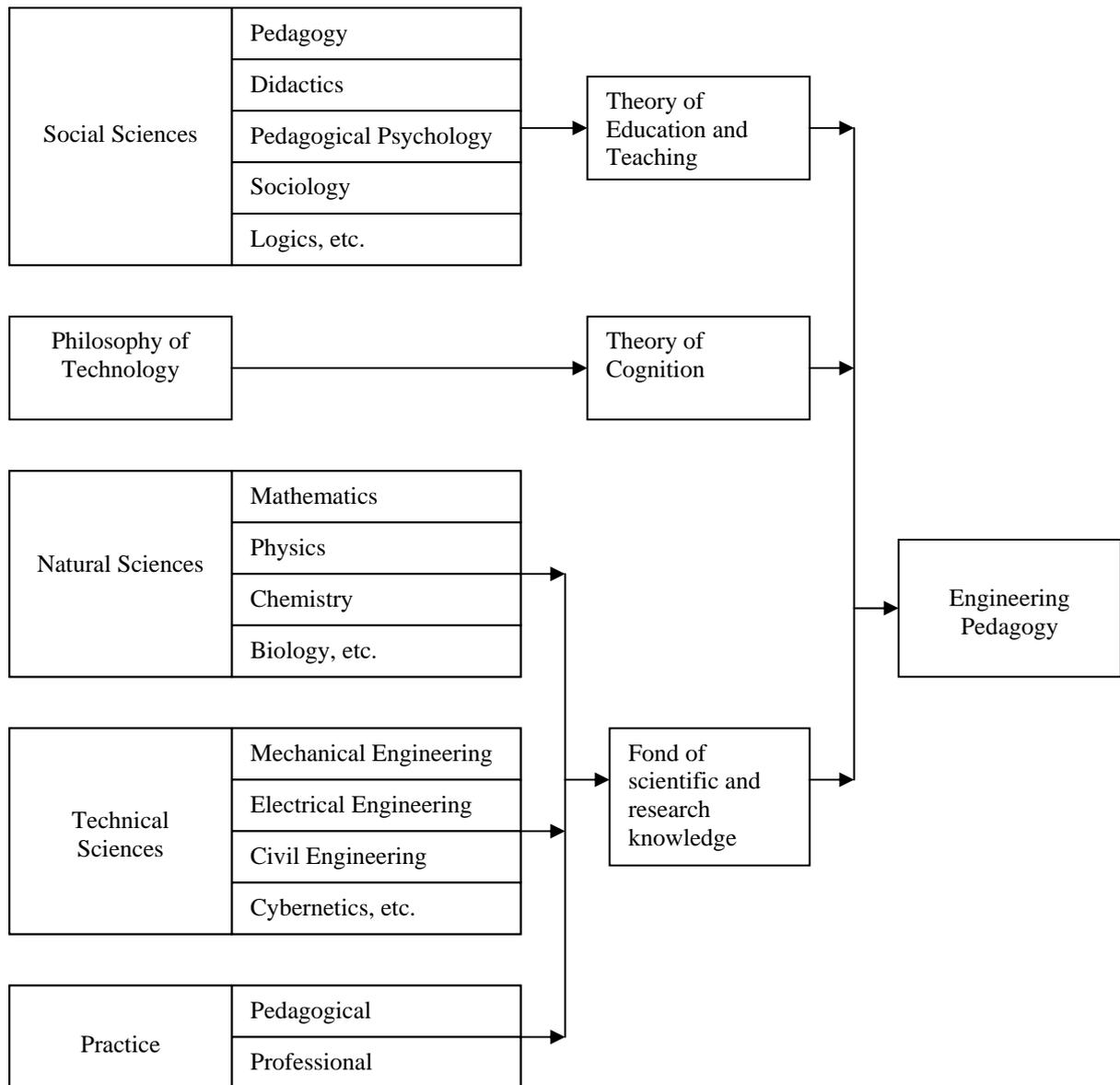


Table 1. Sources of Engineering pedagogy

pedagogy to other scientific disciplines reflects its position in the system of scientific disciplines (e.g. considering pedagogical disciplines it can be included vertically into a group together with university pedagogy, but also with andragogy, and horizontally next to special pedagogy, or didactics), in relation of its integral sections to general didactics and didactics of technical branch, and in relation to the content of technical education. The “engineering pedagogy” notion is closely connected with establishment of International Society for Engineering Pedagogy (IGIP - Internationale Gesellschaft für Ingenieurpädagogik), founded by professor Adolf Melezinek at University in Klagenfurt in 1972. IGIP Slovak National Grup was established at the Slovak University of Technology in Bratislava in 1993 with the following purpose:

- Organizing scientific seminars in cooperation with postgraduate doctoral study executive and the Slovak Union of Scientific and Technical Societies, focused on education of engineers.
- Organizing annual research conferences in collaboration with the Department of Engineering Pedagogy and Psychology of the Slovak University of Technology.
- Developing scientific fundamentals of engineering pedagogy within a framework of national grant research schemes (VEGA, KEGA).
- Informing on the latest engineering pedagogy issues in professionally oriented media (magazines, papers, proceedings, etc.) and publishing contributions on the state and development of engineering pedagogy at international events home and abroad.

In 1997 upon a decision of the IGIP European Monitoring Committee and IGIP Presidium, the Slovak University of Technology was given accreditation for training “euroengineers”, granting the title Eur.Ing., and was recorded into IGIP INDEX. At approximately the same time the Slovak National Monitoring Committee of IGIP was established. Naturally having its seat at the Slovak University of Technology in Bratislava as a leading workplace and research center in the field of engineering pedagogy in Slovakia, it included representatives from technical universities all over the Slovak Republic. Its role can be seen especially within the following activities:

- Informing on possibility of acquiring Ing.Paed.IGIP diploma at all technically oriented universities in Slovakia.
- Monitoring applications for Ing.Paed.IGIP Register.
- Communication with IGIP Board and IGIP European Monitoring Committee.
- Communication with applicants for IGIP euroengineer diploma, and with euroengineers.

3. THE PRESENT AND PERSPECTIVES OF ENGINEERING PEDAGOGY

Within its 50-years history the Department of Engineering Pedagogy and Psychology of the Faculty of Materials Science and Technology in Trnava, Slovak University of Technology in Bratislava, Slovakia has been transformed into a modern and dynamic, internationally accepted educational and research subject. Closely connected with the IGIP National Group and Slovak Monitoring Committee it has become a leading and respected workplace presenting trends in engineering pedagogy. Currently it has transformed into the

Institute of Engineering Pedagogy and Humanities. It continues development of the third degree of university study. So far more than 30 candidates (four from abroad) have completed postgraduate doctoral degree in branch Didactics of Technical Subjects (Engineering Pedagogy). The teaching and research staff carries on theoretical knowledge development through research activities, currently carrying out the three projects:

VEGA national research grant project *“Dominant Determinants and Functions of Engineering Pedagogy after Integration of Slovakia into EU”* aims at research of the current state of Engineering Pedagogy and at completion of its theoretical fundamentals in the frame of related interdisciplinary sciences. The goals and contents as well as the forms, methods and technology specifics for Engineering Pedagogy are the subject of the research. The attention was paid especially to the fields essential for the didactic efficiency improvement in teacher training after integration of Slovakia into EU. The project resulted in designing a model of Engineering Pedagogy implementation into lifelong education.

The trend of a qualitative development in education resulted in national grant project *“Implementation of the “Quality of School” Course into Complementary Teacher Training Curriculum and Its Experimental Verification”*. The general aim of implementing the *Quality of School* course was to make students familiar with the concept, critical evaluation and implementation of Quality Management in their teaching practice and to inspire them to creatively develop the Quality Management methods in the educational process.

The development of students’ key competencies in technical branches of university study is gaining a crucial importance in context of international education agreements, mainly regarding the demands of widening national labour market, particularly that of automotive industry. The idea has resulted in KEGA national research project *“Key Competencies of Students in Technical Fields of Study within the National and European Context”*.

4. CONCLUSION

More than a quarter of the century engineering pedagogy in Slovakia is laying its groundwork. It has a solid background among teachers, undergraduates and graduates of technical universities preparing engineers for demanding conditions of global job market, as well as among a large community of secondary school teachers of technical subjects. There is an increasing number of those interested in acquiring the Ing.Paed.IGIP certificate, and the doctoral study is becoming increasingly more attractive for foreign students. The Department has firmly got established in international professional environment. These above mentioned

relations together with the support of the Faculty and University management make a prospective vision of the future.

5. REFERENCES

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