

## DEVELOPMENT OF QUALITY MANAGEMENT SYSTEM IN HIGHER EDUCATION AREA ON TU KOŠICE, SLOVAKIA

**Prof. Ing. Jozef Novák-Marcinčin, PhD.**  
Faculty of Manufacturing Technologies of TU of Košice with a seat in Prešov  
Bayerova 1, 080 01 Prešov  
Slovak Republic

**Bc. Ludmila Nováková-Marcinčinová**  
Faculty of Manufacturing Technologies of TU of Košice with a seat in Prešov  
Bayerova 1, 080 01 Prešov  
Slovak Republic

### ABSTRACT

*The teachers, scientific workers, referents and students of the Technical University of Košice (Slovakia) works on development and permanent improving of the quality management system (QMS) at the Technical University of Košice compliance with rules ISO 9001:2000 and its consecutive certification. In this paper are presented information about experiences with application and development of Quality Management System on Technical University of Košice in area of higher education, science projects realization and enterprising activities from manager point of view.*

**Keywords:** quality management system, quality control, quality of higher education

### 1. INTRODUCTION

In the proposal of project of Quality Management System (QMS) building on Technical University (TU) of Košice, Slovakia the management of university prepared the policy of quality. This policy was prepared with aim of Long-term Objective of university includes an obligation to fulfil the requirements of QMS and obligation of permanent improvement of its efficiency. Quality policy objectives of Technical University of Košice are subscribed by quality goals of university, these are short-term (appointed for 1 year), real, measurable and regularly evaluated by university. State of quality securing in Technical University of Košice is published in Report about QMS of university, which was composed according to requirements of international standard ISO 9001:2000 and applied to university conditions. Results for individual activities realized on Technical University of Košice are described in Annual reports of university.

### 2. HIGHER EDUCATION SYSTEM IN SLOVAK REPUBLIC

The Slovak term "vysoká škola" ("school of higher education", literally "high school", compare the German name Hochschule), which for lack of other expressions is also translated

into English as "college", can refer to all schools of higher (i.e. tertiary) education, or in a narrower sense only to those schools of higher education that are no universities.

The first university on the territory of Slovakia was the Universitas Istropolitana (Academia Istropolitana) founded in 1465. The main and largest current university in Slovakia is the Comenius University in Bratislava.

The 2002 Act on Schools of Higher Education distinguishes public, state, and private schools of higher education (colleges):

- Public schools of higher education are the basic case. They are established by law. The vast majority of schools of higher education is of this type. They are financed by the government and possible business activities.
- State institutions of higher education are all military, police and medical schools. They are established through the corresponding ministries of the government. They are financed by the government and possible business activities.
- Private institutions of higher education are established and financed by non-government institutions, but approved by the Ministry of Education. This type of school is still quite rare.

Before entering any school of higher education for which there are more applicants than places offered, the applicants have to pass entrance examinations. These examinations take very different forms at particular schools. The "maturita" results of the applicant are usually also taken into account when evaluating whether he can become student of the school. Since the number of branches of study and of schools of higher education increased considerably in the course of the late 1990s (although at the cost of quality of the studies), the general percentage of those not being accepted to these schools decreased considerably over the same time period. As a result, the percentage of Slovaks with higher education has increased considerably over the last decade.

The studies are organized within the following study programmes and "stages" (also translated as levels). Each school must provide at least Stage 1:

Stage 1: Bachelor study programme; 3-4 years; title: "Bachelor" (bakalár, abbr. "Bc.")

Stage 2, or Stage 1 + Stage 2 (Stage 2 lasts 1-3 years):

- Master's study programme; title: "Master" (magister, abbr. "Mgr.") [in art studies: Master of Arts (magister umenia, abbr. "Mgr. art.")]; additional titles after passing a doctoral viva voce are: in natural science "Doctor of Natural Sciences", in pharmacy "Doctor of Pharmacy", in social sciences and art sciences "Doctor of Philosophy", in law studies "Doctor of Laws", in teaching studies "Doctor of Pedagogy", in theology "Doctor of Theology".
- Engineer study programme; title: "Engineer" (inžinier, abbr. "Ing.") [in architecture "Engineer of Architecture" (inžinier architekt, abbr. "Ing. arch.")]
- Doctor study programme; titles: in human medicine: "Doctor of Medicine", in veterinary medicine "Doctor of Veterinary Medicine", in dental medicine: "Doctor of Dental Medicine".

Stage 3: Doctorand study programme; 3-4 years; titles (placed behind the name):

- a) basic title "Philosophiae Doctor" (doktor, abbr. "PhD.")
- b) in art studies "Doctor Artis" (doktor umenia, abbr. "ArtD.")
- c) in Catholic theology "Licentiate of Theology" (licenciát teológie, abbr. "ThLic.") or "Doctor of Theology" (doktor teológie, abbr. "ThDr.")

The Act on Schools of Higher Education 2002 distinguishes:

- University-type schools of higher education: They provide study programmes at all three stages and with a considerable proportion of the 2nd and 3rd stage. Only these schools are allowed to use the word "university" in their name.

- Non-university-type schools of higher education = professional schools of higher education: These are the remaining schools (providing predominantly the first stage only). The academic year begins on 1st September of the current year and ends on 31st August of the next year (in reality, however it ends in May/June). The studies in one academic year may be divided into two semesters or rarely in three trimesters. The teaching process includes various forms of instruction such as lectures, seminars, exercises, laboratory work, projects, practical training, consultations, etc. The credit system following the rules of the European Credit Transfer System (ECTS) has been introduced in 1998 for the organisation of all levels and forms of higher education study. The student's standard load is expressed by the number of sixty credits per academic year and thirty credits per semester. The school of higher education determines the total number of credits required for due completion of the study in its respective stages.

### **3. QUALITY MANAGEMENT SYSTEM IN HIGHER EDUCATION**

A Quality Management System (QMS) is a system that outlines the policies and procedures necessary to improve and control the various processes that will ultimately lead to improved business performance. One of their purposes is quality control in education area.

The concept of quality evolved from inspection, measurement and testing, which had been in practice for many, many years. Long ago, an artist or a sculptor took pride in his work and as a result always tried to excel in what was created. Mass production systems brought the concept of inspection by someone other than the craftsman in the first half of the 20th century. Application of statistical control came later as a result of World War production methods. Quality management systems are the outgrowth of work done by W. Edwards Deming, a statistician, after whom the Deming Prize for quality is named.

Quality, as a profession and the managerial process associated with the quality function, was introduced during the second-half of the 20th century, and has evolved since then. No other profession has seen as many changes as the quality profession. The quality profession grew from simple control, to engineering, to systems engineering. Quality control activities were predominant in the 1940s, 1950s, and 1960s. The 1970s were an era of quality engineering and the 1990s saw quality systems as an emerging field. Like medicine, accounting, and engineering, quality has achieved status as a recognized profession [3].

Quality management is a method for ensuring that all the activities necessary to design, develop and implement a product or service are effective and efficient with respect to the system and its performance.

The International Organization for Standardization created the Quality Management System (QMS) standards in 1987. These were the ISO 9000:1987 series of standards comprising ISO 9001:1987, ISO 9002:1987 and ISO 9003:1987; which were applicable in different types of industries, based on the type of activity: designing, production or service delivery. The standards have been regularly reviewed every few years by the International Organization for Standardization (ISO). The version of these standards was revised in 1994 and was called the ISO 9000:1994 series; comprising of the ISO 9001:1994, 9002:1994 and 9003:1994 versions. The last revision was in the year 2000 and the series was called ISO 9000:2000 series. However the ISO 9002 and 9003 standards were integrated and one single certifiable standard was created under ISO 9001:2000. Since December 2003, ISO 9002 and 9003 standards are not valid, and the organizations previously holding these standards need to do a transition from the old to the new standards. The ISO 9004:2000 document gives guidelines for performance improvement over and above the basic standard (i.e. ISO 9001:2000).

The Quality Management System standards created by ISO are meant to certify the processes and the system of an organization and not the product or service it. ISO 9000 standards do not certify the quality of the product or service.

The quality of higher education has emerged as a key element in the establishment of the European Higher Education Area, and in supporting national progress and competitiveness. Thus quality assurance is one of the main action items of the Bologna Process. In the Berlin and Bergen Communiqués the European Ministers of Higher Education committed themselves to supporting further development of quality assurance at institutional, national and European level, and stressed the need to develop mutually shared criteria and methodologies on quality assurance. They also stressed that the primary responsibility for quality assurance in higher education lies with each institution itself and this provides the basis for real accountability of the academic system within the national quality framework. They agreed that the national quality assurance systems should include evaluation of programs or institutions that would involve internal assessment, external review, participation of students and the publication of results [1].

#### **4. DEVELOPMENT OF QUALITY MANAGEMENT SYSTEM ON TU OF KOŠICE**

Management of Technical University of Košice decided for the Quality Assurance of university processes through the implementation of Quality Management System according to ISO 9001:2000 requirements that promotes the adoption of a process approach and is focused to the enhancing of customer satisfaction by meeting their requirements.

In the beginning of this project it was very important for us to understand well the connections between our university goals (stated by management) and benefits which we'll achieve through the implementation [2].

In order to secure compatibility of the university control systems with every single administrative unit of the university in entire organizational structure and processes with requirements of the international standards EN ISO 9001:2000 Quality Council of the Technical university of Košice (QC TU) was created by the decree of university rector. Functions, organizational structure, authorities and responsibilities of this council are defined in the statute of QC TU (signed 1. 5. 2004). Faculty QC and rector QC are subjects to QC TU. Rector of TU is responsible for asserting the principles of the quality management system of TU. Taking care of the understanding, enforcement and maintenance of the Quality policy he cooperates with vice-rectors and in faculty scope with deans in all fields of activities while securing the quality of TU.

Quality monitoring procedures are described in individual organizational instructions (OI). In the scope of QMS the map of processes on TU was created where managerial, basic and support processes were defined. Individual processes were redistributed to so-called sub-processes, which are described in OI and operation orders of TU. As the main processes was defined: education, science and research, business. Every of these processes are described in organizational instruction where the criterions of quality monitoring are defined as well. These are [7]:

1. Education (OI/TUKE/H1/01): - student's interest in study and study programs, selection process results, number of students registered for an academic year, test results from component subjects, credits from subjects, final exams results from subjects, successfulness of study through years (subjects, final state exam results, final successfulness of study, number of graduates, pedagogical demand of teachers) departments (faculties) TU.
2. Science and research (OI/TUKE/H2/01): - number of national and international projects of research and development planned, number of international projects of research and

development, financial resources amount from international projects, number of national projects of research and development granted, financial resources amount from national projects of research and development, number of finished projects (international projects including), number of projects finished and applied in business groups, publish activity, number of patents and inventions, project's fulfilment in time period given, efficiency of the achieved results of research and development – practicality of appointed goals fulfilment, quality of complex conference service, workshops, exposition, active part in internal and international conferences.

3. Business (OI/TUKE/H3/01): - total business activity costs per calendar year, business activity's profits, economic result of business activity, number of contracts on less than 1666 Eur signed per calendar year, number of contracts on above 1666 Sk signed per calendar year, number of contracts for one-time rental signed, number of discussions with potential customers, profits from contract's fulfilment, number of customers with whose the contracts were signed, contracts on above 3333 Eur, contracts with foreign companies. Business activities are considered through university management, rector's college and Science council of TU once per year.

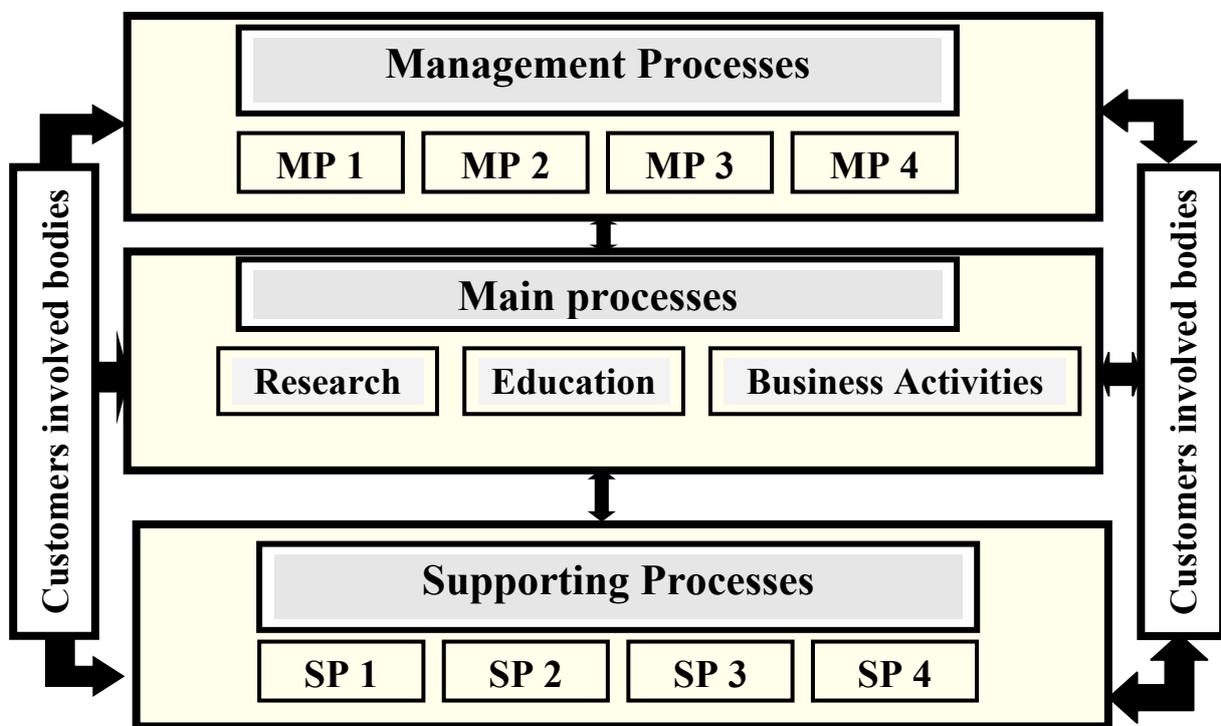


Figure 1. Processes in QMS on TU of Košice

Monitoring procedures for individual projects of TU are described in procedural diagrams and descriptive tables for relevant OI. For measuring customer's satisfaction level separate instruction was created: Customer's satisfaction measuring.

Entries (indicators) defined in order of TU processes monitoring are adequate and extensive enough to suggest applicative remedies after analyzing them.

In the scope of maintenance and improvement of quality management system, so-called Report from performance rating of QMS of TU once per year is being prepared. This report gives an overview about quality level of individual processes (in the scope of the map of processes on TU) and the results of analysis are overturned to suggested remedies. Alongside an internal audits are running on TU (according to OI/TUKE/P6/01 Quality audits). Audit's results are noticed in audit's reports where recommended remedies are suggested including

dates and responsibilities. Fulfilment of these remedies is checked. Results of these activities are used in full extent in decision process and strategically planning of TU.

## 5. CONCLUSION

Both the higher education institutions management and employees must be committed, and participate in the process of change for a successful implementation of ISO 9000. Quality management system can be effective only if all the staff understand the sense of quality assurance and appreciate that their individual and collective responsibilities are essential for the operational procedures to work effectively. For the successful realisation of each project, which means “the change” for organization, is needed to inform the employee well and to assure their involvement. People are the essence of any organisation and their full involvement enables their abilities to be used both for the project goals and organisation's benefit. It is necessary to communicate the objectives and targets for the implementation of the QMS with all the staff.

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## 6. REFERENCES

- [1] Brenann, J. L., Shah, T.: *Managing Quality in Higher Education: An International Perspective on Institutional Assessment and Change*. Open University Press, 2000, 159 p., ISBN 978-0335206735.
- [2] Collective: *Documents of the Quality Management System Implementation on Technical University of Košice*, Slovakia, 2005.
- [3] Gitlow, H. S.: *Quality Management Systems: A Practical Guide*. CRC Publishing, 2000, 296 p., ISBN 978-1574442618.
- [4] Horbaj, P.: Structure of the norms ISO 9000 and ISO 14000. In: *Proceedings of the Conference New Trends in Manufacturing Technique Operation*. FMT, Prešov, 1998, pp. 275-282, ISBN 80-7099-371-5 (in Slovak).
- [5] Kuric, I.: Computer Support - Tool for Increasing the Productivity and Effects of Engineering Activities. In: *Proceedings of the International Conference „Innovation and Utility in the Visegrad Fours“*. Nyiregyhaza, 2005, pp. 647-652, ISBN 963-86918-2-4.
- [6] Marcinčin, J. N.: Quality and Modernization of Study in Specialization of Design of Robotic Devices on FME TU Košice. *Pedagogika*, Vol. 43, No. 1, 1993, pp. 88-90, ISSN 0031-3815.
- [7] Marcinčin, J. N.: Application of the Quality Control in Education Area on the Faculty of Manufacturing Technologies of TU Košice. In: *Proceedings of 5<sup>th</sup> Research/Expert Conference with International Participations “Quality 2007”*, Neum, 2007, pp. 573-577, ISSN 1512-9268
- [8] Marcinčin, J. N., Murčinko, J.: Control of People Sources on Department in Context of Faculty Development. In: *Proceedings of the seminar in program TEMPUS S JEP 11011/96 „Management of Quality and Methods her Evaluation“*. TU Zvolen, 1998, pp. 91-97, ISBN 80-228-0836-9 (in Slovak).
- [9] Rose, K. H.: *Project Quality Management: Why, What and How*. J. Ross Publishing, 2005, 192 pp., ISBN 978-1932159486.
- [10] Sallis, E.: *Total Quality Management in Education*. RoutledgeFalmer Publ., 2002, 176 pp., ISBN 978-0749437961.
- [11] Schlickman, J. J.: *ISO 9001: 2000 Quality Management System Design*. Artech House Publishers, 2003, 406 p., ISBN 978-1580535267.
- [12] Summers, D. C. S.: *Quality Management: Creating and Sustaining Organizational Effectiveness*. Prentice Hall, 2004, 432 p., ISBN 978-0132626439.