

“Lucian Blaga” University of Sibiu

Faculty of Engineering

**CONTRIBUTIONS REGARDING
THE QUALITY ASSESSMENT OF
EDUCATION IN THE FIELD OF
INDUSTRIAL ENGINEERING**

SYNTHESIS

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INTRODUCTION

Higher education is placed at the intersection between research, education and innovation being the main element in Europe's competitiveness. In this regard it is emphasized the main role of the higher education institutions, teaching staff and students as partners in the Bologna Process.

The quality of higher education is a general concern as well as from the Romanian context's perspective and the country's aligning to the European Union requirements, where the subject is still of great interest. Romania prestigious universities must become more competitive among other universities from the EU area and worldwide.

At present the attention it is concentrated on changing the educational practice, from the teacher's controlled pedagogical approach, toward a more transparent approach, by involving the community and parents, which will support the student's initiative that facilitates collaboration, lifelong learning and personal skills development.

The general objective of this research is to achieve a quality management system that reacts to the environment's continuous changing: organizational, cultural, political, economic, social, technological and strategic orientation of higher education institution.

The specific objectives of the scientific research are:

1. Orientation toward client's faculty. Orientation toward the needs of these partners-clients refers about the fact that the higher education institution should understand current and future needs and to meet their requirements and expectations.
2. Continuous quality improvement through internal and external evaluation and the institution's orientation towards academic excellence (TQM).
3. Establish mutual profitable relations with "stakeholders".
4. The endorsement and development of a partnership guide and the industrial engineering community involvement in training and technology parks development.
5. Strengthening institutional capacity by steering the higher education institution to the European Higher Education Area.
6. Elaboration of a set of indicators for assessing the quality of education in industrial engineering.
7. The development of an implementation strategy in technical faculties of a quality management system in education.
8. Software development for evaluating the quality of education in industrial engineering.
9. Recommendation and achieving an evaluation manual of teachers for higher technical education in industrial engineering.
10. Strengthening the role of higher education institution in assessing the process of acquiring the competencies and skills by the graduates and if the acquisitions are sufficient to allow the graduates the insertion on the labor market.
11. Prepare the graduates' report required by Law 1/2011 of MECS regarding the Rector's obligation of diffusing the information about the graduates' situation.
12. Developing a large database for the ALUMNI situation which is the base for ARACIS accreditation of specializations.

13. Statistical analysis of the ALUMNI situation elaborated by “Lucian Blaga” University of Sibiu
14. Statistical analysis of the ALUMNI situation elaborated at the level of the Faculty of Engineering, Sibiu.
15. The analysis of Institutional Assessment Reports of public universities in Romania on identifying their weaknesses in order to achieve the quality and its orientation towards academic excellence.
16. Creating a database in order to achieve statistical analysis on quality in Romanian public universities.

Chapter 1 contains a brief history about the quality assurance in higher education covering introductory elements in this vast research field.

In this chapter we have developed a **study in order to identify the weak points of the technical higher educational institutions**, the information was taken out from the External Institutional Evaluation Reports delivered during the ARACIS institutional assessment visits commission on the external evaluation of academic quality 2007-2012, found on the ARACIS’ website www.aracis.ro/evaluaireintitucionala/, under Annex 1 of this scientific work. This research is a starting point in approaching the management of quality in technical higher educational institutions.

Chapter 2 emphasizes the current state of quality assessment in technical higher education. Currently the focus is increasingly on developing quality management systems in each higher education institution in order to get oriented towards competitiveness and excellence. In this chapter we have developed a synthesis of Romanian and foreign works on quality assurance in education, accessing a consistent bibliographic lists.

In this chapter we have approached the issue of quality assurance from a personal perspective in order to focus on the performance of technical higher education institution, in terms of placing it in the European Higher Education Area.

By strengthening the European Research Area, the member states together with key stakeholders have to take measures to stimulate investments and to promote competition at national level, to optimize transnational cooperation through research infrastructures, to facilitate the researchers’ mobility, tackling gender equality and to improve access to scientific knowledge. According to the EU Strategy, Europe 2020 sets out a strategy for the XXI-st century Europe's social market economy focused on the skills and lifelong learning.

We have also completed an analysis of the quality of higher education as the foundation for shaping the European Higher Education Area as a starting point being its main features, namely: the general framework of qualifications, common standards of quality, European recommendations, recognition of diplomas and study periods, cooperation and experience exchange with other universities in other parts of the world.

By placing the Romanian universities in the European Higher Education space shall ensure confidence in the quality of education and achieves the academic and professional recognition of the Romanian diplomas.

In this chapter we have completed an analysis on the European Council Report – “The pact for economic growth and working places”, the European Commission is restoring financial stability and deepening the economic and monetary union, through actions designed to

generate economic growth and jobs. This analysis shows that in terms of research and innovation, the European Commission focuses on research providing public support as part of the financial framework 2014-2020.

Chapter 3 handles the management quality in higher education: definitions, main features, **presenting an analysis of current state of quality assurance mechanisms in six countries participating in this study: Austria, Germany, Finland, UK, USA and Canada.** We performed this analysis for understanding the problems and identifying the new one having in view the quality assurance in higher education. The study is based on a case study on international comprehensive research and an analysis of the current mechanisms for quality assurance. In order to accomplish the research we have studied traditional literature and the internet information. Introducing quality management in institutions, and strengthening national systems of quality assurance, provides guidance toward performance and competitiveness.

Starting from the premise that the SWOT analysis is the most important of management techniques used for understanding the strategic position of an organization, the original element brought in this chapter is that we conducted a SWOT analysis of the Faculty of Engineering from Sibiu (FIN) its purpose being to identify the strengths, the weaknesses and the risks that threatens the faculty and also the development opportunities in achieving the strategy of improving the institutional management.

Taking into consideration all these aspects, we have considered necessary to create a **“Guide regarding the quality management in higher technical education” - Annex 2,** because we have noticed that many technical higher education institutions do not implement the quality assessment standards.

We have published this guide as a tool for quality assurance complementary to the current standards. In this “Guide” we completed a synthetic representation of the relationship between the fields, the criteria, the standards and the ARACIS performance indicators and chapters of the guide.

What distinguishes this guide from the ARACIS guide are the innovation elements presented in Chapter 3 through the recommended management system that is guided by the principles-based approach processes and in Chapter 8 regarding the continuous improvement methodology through various tools such as: PDCA methodology, 6 sigma, flow chart, cause-effect diagram, Pareto chart, control charts.

Chapter 4 deals with the definition of the concept of quality assessment of a study program or of an institution of higher education as it is regulated by the European Association for Quality Assurance (ENQA). The effects found within the context of improving the quality are of financial matters with consequences over the recognition of a degree program (with or without accreditation) linked by: the right to request accreditation (where quality assessment is a requirement); institution’s financial support from the budget; student’s financial support through education loans, access to research funds, recognition of diplomas by the State.

In this chapter we considered necessary to develop a study on the state of quality in technical public universities in Romania. The analysis’ purpose was to identify the public technical universities, on faculties, undergraduate and the new majors established, accredited, provisionally approved or dissolved after the institutional assessment of the Romanian Agency

for Quality Assurance in Higher Education (ARACIS). The analysis was based on HG no.707 / 18.07.2012 and SPSS software through which we processed the data used in Appendix 3.

After this analysis we found out that in 22 public universities with technical profile operate 50 faculties and 374 majors. Out of the total of 374 majors, one third of them, meaning 128 majors are as follows: 60 new majors were established out of which 37 received temporary authorization, 23 new specializations have received accreditation, 42 majors received the accreditation and 26 majors were dissolved.

Also in this **chapter we have accomplished a benchmarking and ranking analysis at the institutional level in order to identify best practices and to improve quality at “Lucian Blaga” University from Sibiu (LBUS)**. According to Ad-Astra ranking, “Lucian Blaga” University from Sibiu was on the 22-nd position in terms of published articles in 2006-2010 and in the period 2002-2011 it was on position 25 in terms of indexed articles according to the List of institutions with research activity in Romania, out of 49 universities participating in this study.

Studying the internal assessment report, as a result of this analysis, we can say that through the example of “best practices” LBUS confirmed that the central objective of the overall strategy is the **quality of education**, this approach is in direct accordance with the development strategy of higher education. Successfully implementing the management system by the existence and operation of specific structures of the quality management’s system, we can say that LBUS promotes and maintains inside the university a quality culture focused on continuous improvement of all activities. In order to identify the problems and to establish the measures of improvement are used the questionnaires for teacher’s evaluation. **The personal contribution in this chapter resides in developing the questionnaires which will be improved by LBUS’s quality experts and sociologists.** To collect the data and to process the information was used a specific software “Quantis” (<http://quantis.ulbsibiu.ro>) supplied by Red Point Romania, which centralizes the data and sends the reports after processing each questionnaire. Applying this evaluation system for the Faculty of Engineering, the reports showed a good overall average at both faculty and university level, in relation to: assessing the students’ level of satisfaction having in view the professional and personal development, the teaching activity evaluation, the collegial group evaluation and teachers’ evaluation by the students.

In this chapter we have also considered necessary to draw up a scheme evaluation program of courses that allows students to anonymously evaluate the courses in the curriculum. The evaluation itself must follow the next steps: registration, documentation, evaluation and certification.

Chapter 5 it concerns with the relationship between the university and the economic environment, presenting the relationship’s quality indicators between the university and the economic environment, emphasizing good practices in relation to university / faculty and economic environment. The university’s performance and the economic agents’ competitiveness rely on the quality of products and services given that the competitive market surpasses the “borders” of the national territory. It is necessary to know and agree on the concepts and principles of a functioning market as well as the role of the companies’ main “external client” of the university, as a supplier of intangible (knowledge and skills) and services (training, research, design, consulting, etc.). Before providing on the market quality products and services it is necessary to be aware of the requirements and needs of the economic environment and after providing the products and services to be collected the level of satisfaction / dissatisfaction of the

economic environment. SWOT analysis presented in Chapter 2 can be said that through the example of “best practices” between the university / faculty and the economic environment and will be created joint research laboratories and teacher training programs with prestigious companies in Sibiu, in particular foreign investors that will develop their activity in this area. In this way, the Faculty of Engineering of Sibiu will create a positive image in the local and international technical community. Students' placement it is conducted in collaboration with local and national partners and through EU financial support projects.

The personal contribution in this chapter is the proposed specific objective: “Partnership guide and community of engineering involvement in the development of technology parks” - Annex 4.

Chapter 6 deals with the **study of graduates insertion on labor market** and it was based on monitoring questionnaire “Graduates and the labor market” (<http://www.absolvent-univ.ro/acasa/informatii-utile/universitati-participante.aspx>) - Annex 5, where we proposed a detailed analysis of LBUS performance, namely the Faculty of Engineering from Sibiu in order to obtain the graduates academic and professional experience feed-back during two distinct phases of implementation: the first stage were invited to participate in the study graduates of 2005 and 2009 recorded 39. 308 respondents, and in the second stage targeted graduates were part of promotions 2006-2010. Because MECTS study database was updated only with the promotions 2005 and 2009, this study covers this period.

The personal contribution to the study was to create a large-scale database by sending invitations to the graduates in order to respond to the questionnaires, analyzing and processed the graduates' responses. The data processing was based on the application UMS (University Management System) in LBUS and SPSS Programs.

The new National Education Law 1/2011, it is compulsory that the rector to report the situation of graduates (alumni), and also as an indicator for ARACIS assessing.

The first results of the study are:

- obtaining reliable information about the entire system of higher education;
- assessing the skills and competencies of graduates;
- fulfilling the objective of increasing the quality and attract international programs and institutions;
- institutional performance due to increased interest of policy makers in many countries to allocate funding based on performance indicators.

The recommendation is that the study results to be used by the university / faculty in order to improve the quality of study programs offered educational, to adjust the educational offer to the market's demands and the develop of the strategic development program, its use by policy makers and public authorities, as a foundation for policy decisions makers, so it will be fundamental support for decision-making on technical higher education system.

As future research approach I proposed that to continue this study for promotion 2006-2010 and extending it to the other faculties of LBUS.

Chapter 7 presents the **study of employers' perception on “Lucian Blaga” University of Sibiu graduates** and I will try to obtain the feed-back from the employers in order to strengthen the university's role in assessing how the knowledge, skills and abilities acquired are

sufficient in order to allow the graduates of higher education the employment on the labor market.

The personal contribution in this chapter was to achieve the questionnaire regarding the employers perception on LBUS graduates - according to Annex 6, sending it to the employers and the processing the responses. Data processing was based on application UMS (University Management System) of LBUS and SPSS Programs.

The original results obtained from this study are:

- the interest of employers to obtain the information on programs and qualifications which help them better understand the skills and competencies acquired by graduates;
- increased interest of employers in search of information about the profile, experience and reputation of higher education institution in research and development and education and training for choosing university / faculty as a partner in projects and strategic partnerships;
- the interests of governments and policy makers in obtaining reliable information about the entire system of higher education will serve as the foundation for policy makers and the objectives' assessment such as raising the level of skills and competencies, improve the quality and attractiveness of programs and international institutions for students were fulfilled.

In **Chapter 8** we have shaped the general conclusions derived from studies developed in the thesis.

Chapter 9 contains suggestions and directions for future research on quality assessment in industrial engineering higher education.

Future research in industrial engineering higher education quality assessment will focus on the quality of study programs:

- developing a benchmarking study on areas of study;
- developing a benchmarking study on study programs;
- continue the monitoring study "Graduates and the labor market" for promotions 2006-2010 and extending it to the other LBUS faculties;
- create a web page structure for the faculty which will contain the education quality assurance system;
- development of a modular curriculum for the area of industrial engineering higher education;
- develop a set of specific indicators for assessing the quality of education in industrial engineering higher education;
- development of a software for evaluating the quality of education in industrial engineering;
- development of a software for courses evaluation at technical higher educational institution's level;
- editing an evaluation manual of teachers for technical higher education in industrial engineering;
- development of a Guide for good practice for quality assurance in technical higher education;
- the study of quality assessment for other faculties with different profiles;

- the study on identifying the weaknesses of the other faculties.

Chapter 10 presents the original theoretical and practical contributions in education in industrial engineering. Finalizing the thesis is a starting point for future research directions regarding technical higher education, over which I intend to focus my attention in the future in order to find new solutions on improving education quality management in industrial engineering.

Chapter11 contains bibliographic sources that inspired me in developing this thesis.

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