

Implementation and functioning of quality management in the research centre

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ABSTRACT

Purpose: The purpose of the study was to present a view of problems of quality management system in university education in the field of education and research.

Design/methodology/approach: In the paper there was presented an approach to quality management system in the institute and associated requirements and purposes.

Findings: The paper presents problems of implementation and functioning of quality management system based on standard ISO 9001:2000 with reference to the other means of assurance of quality in education.

Research limitations/implications: The article presents problems of implementations quality management systems at the example of only one unit being independent organizational unit of the university.

Practical implications: Presented in the paper opinion should acquaint with advantages of introduction in the universities the quality management system based on standard ISO 9001:2000 in the field of education and research.

Originality/value: The paper is based on personal experience of the authors in introduction of the quality management system in educational units with usage of standard ISO 9001:2000. Nowadays this is the only organization in the education which has introduced and certificated quality management system in Poland.

Keywords: Quality management system; Education; Research; University

1. Introduction

Polish universities passed during last decade important changes associated both with change of political orientation and with convergence to principles and legislation of EU.

Although a number of things changed - the goals, the sources, the requirements and the conditions - the present management systems of Polish universities do not reflect it, there are still traditional principles. The universities need modern management. A lot of problems and standard situations are solved by ad-hoc way. The existing management systems are without necessary transparency and formalization.

The implementation of quality management system (QMS), as part of university management, is the way how to realize this purpose.

The management of Institute of Engineering Materials and Biomaterials decided to implement quality management systems

into Institute management in the first half of 2006. The decision was supported by obtaining certificate of quality management system based on ISO 9001 standards.

2. Quality management in Higher Education

When the foundation of a modern university was laid in Berlin in 1809, it was firmly believed that autonomy should be an essential ingredient of excellence of universities. The founder Wilhelm von Humboldt proclaimed the guiding principles to be "independent status of staff" and "free choice of subjects". This was guarded by system of governance called a collegial process, promoting a wide consultative style of management. This

was supposed to create a stimulating, but supportive environment where the academics have a considerable degree of autonomy and creative space to develop curricula and conduct research.

Prior to 1980s the management of performance in universities was controlled by fairly routine procedures. Professional associations (engineering, medicine) performed the tasks of carrying out accreditations. Universities had their own committee systems with a generally distributed participation, to oversee performance standard.

Management of educational institutions is becoming more and more difficult because of very fast changes in their environment. Universities are dealing with a lot of problems: how and by what means planned activities should be done receiving the best economic effectiveness and not missing quality of offered education. It should be noticed about competition which is more and more aggressive because nowadays at times of demographic depression skillful attraction and maintenance of the student is very important [1-4].

Quality of education is becoming one of the elements of formation of strategy of education in the university and other educational institutions.

Idea of "quality of education" is relatively young and it replaced the concept of "effectiveness of education" which was used until now.

Quality of education is differently defined by the authors, as for instance expression of significant range of educational effectiveness and reflection of a new approach in which need of systematic evaluation of undertaken activities is taking essential meaning including improvement and making endeavors towards accreditation which aim is to confirm that all the standards of educational effectiveness are provided [5,6].

The essential fact in all these considerations is that every university realizing trend of progress should form quality of education as well as quality of carried scientific researchers.

The problems of quality of the education is enrolled in the undertaken activities in the international area what is expressed in process beginning in 1999 of leveling of the barriers in cooperation between universities which was called Bolonian Declaration and was signed by ministers of education in 29 European countries, including Poland.

Further activities undertaken in this direction are expressed in the Parisian Announcement (2001), Berliner Announcement (2003) and during Conference in Bergen (2005). These activities tend to creation of the European Field of High School Education in 2010 based on realization of postulates concerning [7,8]:

- introduction of the system of readable and comparable degrees in the aim of promotion of the possibilities of employment of European citizens and assurance of competitiveness of European system of university education,
- introduction of the system of points in the evaluation of the students (ECTS),
- cooperation in range of assurance of the quality.

Announcement from Bergen comprises also attachment "Standards and instructions concerning assurance of the quality of the education in the European Field of High School Education".

Bolonian Declaration was the first which emphasized the problems of assurance of high level of the education and necessity of adaptation of the system of the education to the needs of the work market. One of the fractional purposes of the Bolonian

Declaration was "promotion of the cooperation to increase quality of the university education", which was interpreted also as "cooperation to assure quality of the education".

It should be emphasized that the Bolonian Process is tending to harmonization but not standardizing of the process of education assuming that in variety of the harmonized systems lies power of development with respect to the autonomy of the university.

The idea of quality of the education is not easy to define as far as it is easy to establish the concept of the process of education.

There are so many definitions of the quality as opinions about these problems beginning from the classics of the science about quality, theorists and practitioners to the personal look of the customer at quality of the service or the product. The quality is a complex idea this is why its definition is still searched.

Education is a process depending on providing the service in which a lot of subjects participate, not only a student and a teacher. Considering this one could look for answer to the question how to define quality of the didactic service realized by the universities. But one should remember that not only didactic constitutes the sense of the existence of the universities.

Ch. Gronrossa ascertains that description of global quality of the service is needed what is possible by comparing the expected quality with the quality experienced in the process of its providing. In such comprehension the quality is possessed by the service which was done according to the expectations of the customer. Remembering that in case of educational service it is essential to look for confirmations how it is done based on defined criteria such as plans of the studies and the others [7].

With reference to the process of education, the idea of quality of the education is very often found next to effectiveness or efficacy of the education.

A.I. Vroeijenstijn creates the following definition of the quality of the education: "It is a result of the negotiations between all the participants of the process of the education when these negotiations concern realization their expectations by university education. The system of university education should tend to realize all these expectation in the best way through clear description of the purposes of the education at the university level." The participants of this process are students, teachers, employers, government, community [11].

The quality of the realized process could be described in different aspects [5]:

- financial effectiveness – looking for the response to the question how universities spend public money,
- academic standards – realizing activities aiming maintenance suitable level of education in the universities,
- public usefulness.

The problems of the quality of the educational services refers to the following fields [13]:

- effective organization of the process of the education,
- variety of educational offer,
- determining the requirement to the students,
- competences of the persons conducting the classes,
- quality of the relation with lecturers and managing personnel,
- access to the infrastructure supporting the education.

Here it should be emphasized that even in the Announcement from Bergen there is no definition of the quality of the education, but so expressions as culture of the quality, the quality management, assurance of the quality could be found.

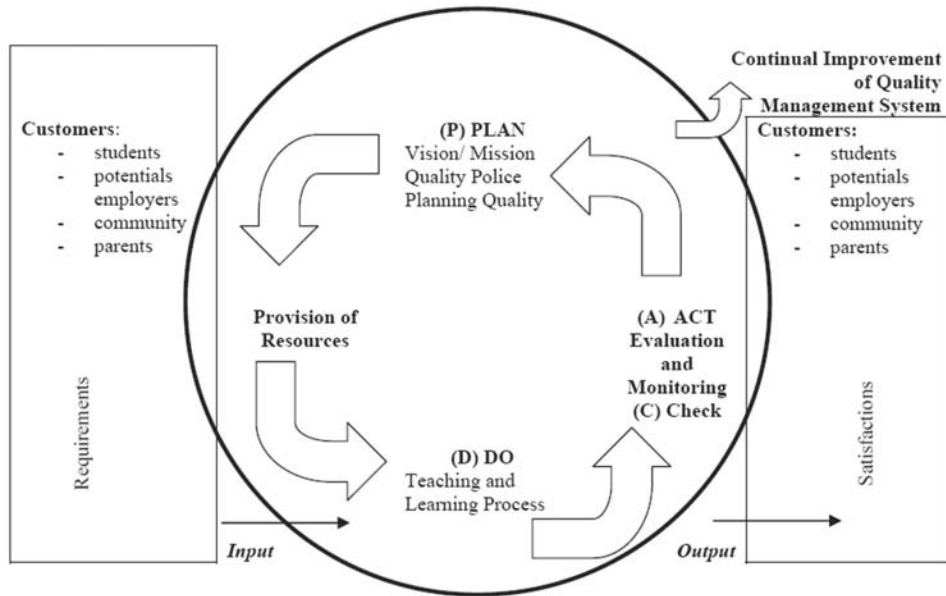


Fig. 1. Processes based quality management system in education

Based on the discussions above, quality in higher education can only be fundamental by a deep rooted shift in culture at the academic level within the universities. Attempts have been made to adapt the models of quality management from industry. Two of the more well known ones considered for implementations are:

- Quality assurance system to ISO 9000 standard, and
- Total Quality Management (TQM) model.

The most often used definition is assurance of the quality of the education. Wanting to define the quality of education and using methodology of the science it is difficult to agree that expression of assurance of the quality with reference to the problems discussed here is the most proper. According to the obligatory norm PN EN ISO 9000:2001 "Systems of the quality management. Basics and terminology", assurance of the quality is understood as part of the quality management [16].

There are a number of problems, which may outweigh the initial gains for the education sector. They seem to arise from the fact that the standard is fundamentally suitable for structured procedures required for rendering specific services. Such services have well-defined processes which could be managed and controlled. Education tends to be too subtle and far too extensive in the processes and delivery, to be specified and controlled by variables. The ISO 9000 standards were adapted to education, by BSI British Standard Institution in 1991 [17].

The quality of the services provided by the universities should play a strategic role in the management of the university. Universities must be aware that suitable quality of the education, service and the communication ensure not only optimization of usefulness of the service for the student but also it makes possible effective competition at the market.

The market of services in the field of university education must tend to continuous improvement of realized by themselves processes. Such possibilities are suggested by the elaborated

standard concerning quality management systems ISO 9001:2000 [13-17]. The development of quality assurance systems has been described with references to Demings, Plan, Do, Check and Act (PDCA). The process based on the Quality Management System involving four stages of PDCA cycle has been shown in Figure 1.

The norms of ISO series 9000 are characterized by stable position in the international area as recognized collection of rules of proceeding and forming of the processes in purpose to improve them but also they could be introduce in every economic subject as well as in the universities.

The problems of the certification of the quality systems are more and more appreciated, also in the sphere of education, especially after 2000.

One should solely emphasize that obtained certificate of the introduced quality management system based on standard ISO 9001:2000 is not a quality mark but guarantee that this system fulfills requirements described not only in the standard but also in the superior papers as act about university education or statute of the university [16-19].

Significance of introduction and obtaining a certificate of the introduced quality management system and further its maintenance is a confirmation that realized processes are performed in still supervised and improved conditions. Such information means more and more not only for the industrial customers purchasing material goods but also in the sphere of servicing subjects [3,7,19]. Undertaking by the university the introduction of the quality management system based on norm EN ISO 9001:2000 is associated with gaining general philosophy of the quality with reference to all the participants of the realized processes. So it is a conscious activity with purpose of accompany the global movement of the quality – involving all the employees in the process of maintenance and improvement of the system. [3,6,16].

This activity is based first of all on conviction about rightness of using specially elaborated procedures adapted to the specificity of the university, department or organizational unit which in a readable means establish proper organization of the work.

The problems of introduction and maintenance of the Quality Management Systems based on standard ISO 9001:2000 is widely described basing on rich experiences associated with functioning of these systems despite using different methodologies during introduction and auditing of these systems.

It is essential and incontestable that the main need associated with the education which is noticed by the authors concerns establishing and introduction of the procedures of actions in the spheres of realized activities in the processes of education in purpose to obtain their transparency, accuracy and sequentiality.

All above mentioned allows to establish for instance procedure of realization of the plans of the studies or flow of the documents during the study.

Known advantage of introduction of systems based on standard ISO 9001:2000 is also care about continuous monitoring and improvement of the realized processes [16].

Taking into account very well described in the literature successes of the firms which introduced quality management systems based on standard ISO 9001:2000 allows to think that also introduction it in the universities helps them to reach the success. Only clear and precise described schedules of proceedings assure enough reproducibility in care of quality of education [16].

The university taking decision to begin process of obtaining the certificate of the introduced quality management system according to standard ISO 9001:2000 must undertake such activities as:

- description of politics and purpose of quality
- establishment of responsibility and competences of all the employees
- calling the plenipotentiary to quality system
- elaboration of necessary documentation of the system including description of the processes.

Advantages of introduction and maintenance of the quality management system in the university there are as follows:

- improvement of quality of the realized didactic process
- improvement of work organization
- transparency and readability of responsibilities and entitlements,
- supplying documentary evidence of the processes and activities in shape of readable procedures,
- increase of awareness of quality among the employees,
- fulfillment of requirements of the customers,
- improvement of reputation.

Total Quality Management (TQM) is a synthesis of well-known management practices aimed at creating an organisational culture where every one will work contribute to overall quality of the products and services. Unlike ISO 9000 standards, there is no single definition or approach to TQM. Although Deming's original 14 points tend to be an important guide, many Western masters, like Crosby, Peters etc. provided a substantial slant in emphases, followed by a large group of Japanese masters like Ishikawa, Shingo, Taguchi etc. Hence TQM remains a very rich field for potential management practice. There is a broad field for inspiration and guidance. More recently, many countries have instituted

national quality awards e.g. Malcom Baldrige Quality Award (US) which encapsulate these principles of TQM into measurement oriented frameworks of management practices, which are available for any organisation to seek some guidance from.

As far as application of TQM to higher education is concerned, there are serious problems identified with its adoption [10, 14]:

- In TQM the processes are supposed to be customer driven. In higher education the critical problem is identification of the *customers* or *products* to 'drive towards'. The customers can variously be students, employers, government etc. and in the same way the products can also be education, knowledge, research etc. This creates a considerable lack of focus for the groups involved with the processes.
- With its measurement and process focus, TQM makes an implicit assumption that the processes are amenable to measurement. On the other hand many processes in education are too subtle to be measured.
- In addition, the main tenet of effective communication required within a university for TQM implementation is rarely reached. There is rarely a shared vision, and the academic managers in an attempt to retain power act as communication block. The participation in decision making at all levels rarely ever takes place.

3. Implementation of quality management system in the Institute of Materials Engineering and Biomaterials

The decision to implement QMS into Institute management is the strategic decision. It is the change of institute management. Such the change **has to be led by the top management of the institute**. Without his active approach the proper functionality of implemented QMS could not be reached.

The internal audits were found as the very effective tool.

Not only as the tool for identification of issues (nonconformities) and possibilities for improvement, but also as the means which helps to the dissemination of information and awareness about QMS both at faculty and institute level. Internal auditors act the role of promoters. They spread the best practices in the informal way from audited area to the departments they come from. It is probably the best way how to involve the abilities of people at all level to be used for organisation's benefit.

The mission statement shows that Institute made the strategic decision to set its ambitions high. The goals to fulfill this mission are equally ambitious:

- Education: challenging for our students and of a high international level,
- Research: efficient and of high international level,
- Management: efficient processes and highly qualified managers.

The positioning of our university in the national and international arena is a major task for the Board of the university. It has do with the actual performance of the university, both in terms of education and research, but also with strategy and competition.

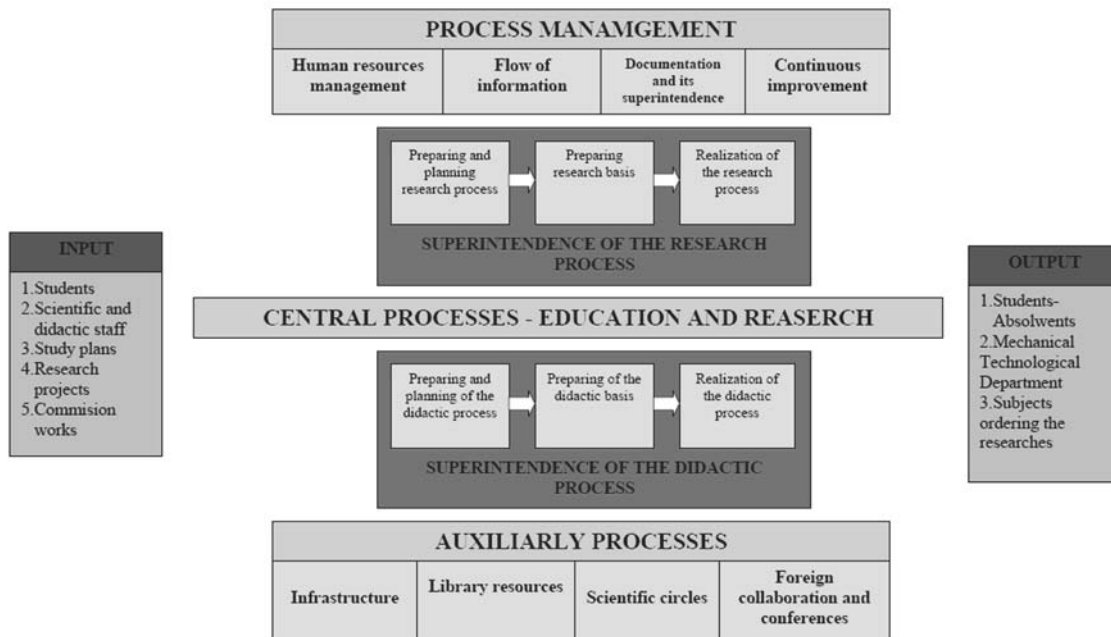


Fig. 2. Map of processes in the quality management system in the Institute

The phase of preparation consisted of 5 steps:

1. The decision of institute management about implementation of QMS as inherent part of management.
2. The declaration of mission, vision and strategy (quality policy).
3. The definition of project team for implementation of QMS.
4. The reservation of sources.

Next it was followed by the implementation phase consisted of 7 steps:

1. The staff training about QMS.
2. The implementation of process approach: identification of processes and definition of the process map, definition and documentation of processes, definition of criteria for process performance assessment.
3. The comparison of existing processes with ISO 9001 requirements.
4. The implementation so far missing procedures (control of document, control of records, internal audits, control of nonconforming product, corrective actions, preventive actions).
5. The trial period.
6. The improvement of existing processes based on evaluation of trial period.
7. The certification of QMS in the BSI.

The processes at the faculty level were grouped into:

- Customer related processes (education – bachelor, master and doctoral level, RD activities, and cooperation with industry)
- Managing processes (strategy management of faculty, operational management of faculty, and source management)
- Supporting processes (support of education process, support of RD, purchasing, control of information system.)

The trial period preceded elaboration of all existing processes and implementations of ISO 9001 required procedures.

These processes were completed by customer satisfaction measurements. The satisfaction was evaluated by:

- students during their study at the university,
- students after some years of their professional career,
- employers with graduate's skills,
- industry partners.

The Institute of Engineering Materials and Biomaterials passed successfully the certification audit and received ISO 9001 registration on May 2007 as the first faculty in Poland in the field of education and research.

Quality management system in the Institute is based on elaborated map of processes – presented in Figure 2.

Processes at university level differ from those in the industry.

Processes of source management are the main, customer orientated processes from the point of view of the university:

- finance management,
- facility management,
- human resources management,
- IT management.

The time from the beginning of implementation QMS in the Institute is rather short for full evaluation. However we can point at the improvement in following areas:

- **Increased level of management processes in the institute**
It is the main improvement. Previously the situation were solved ad-hoc. QMS defines the rules.
- **Better set-up of activities inside the institute, accurate definition of authority and responsibility**



Fig. 3. Activities tending to assure quality of education [2,12,17]

The process approach enables to define the activities and their relation inside institute with corresponded authority and responsibility in the simple way.

- **Forcing the institute to identify and satisfy the actual needs and expectation of their customers**

QMS forces the institute to identify and satisfy the actual needs of their customers.

- **Saving of operating expenses**

The proper set-up of activities inside the institute together with accurate definition of authority and responsibility leads to elimination of wasted effort and it brings saving of operating expenses.

- **Improvement of the educational processes**

The identification of actual needs and expectation of institute customers, evaluation of customer satisfaction, better set-up of activities inside the institute leads to improvement of the educational process.

- **Improvement of competitive ability of university**

ISO 9000 registration is a competitive advantage. It is the evidence the institute is properly managed, the needs of their customers are identified and the environment to satisfy them is established.

- **Increased proactive behaviour of employees**

The existence of defined procedures for problem solving (control of nonconforming product, corrective action, and preventive action) and tools for independent assessment of any designed process or activity (internal audit) leads the employees to proactive behaviour.

4. Summary

The authors of the paper emphasize the essence of the conducted activities in limits of legal supervision influencing quality of education. However, in context of individual approach to the essence of discussed in the article problems it seems to be correct to benefit from rich experience of the science about management (including quality management) and implementing in the universities certificated quality management systems as a tool of maintenance and improvement of conducted didactic and research activities.

The suitable level of the quality of the education one could reach through realization of the external and internal activities (Fig. 3) [2,12,15]. However, what is essential, realized in conditions of the introduced and certificated quality management system undertaken internal activities can be characterized by bigger value added arising from their realization.

Interest in adopting quality assurance systems to ISO 9000 standards to higher education is broadly confined.

The main advantage to the organisation stems from the amount of team work required to develop the quality manual which specifies the Quality Assurance System. There is a considerable clarity obtained by the members about their role and how to deal with any situation.

The fact that the organisation has an accreditation is a sufficient publicity for the prospective customers of the organisation.

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