



Improving activities in the processes of ensuring the quality of education in higher education schools and scientific institutes

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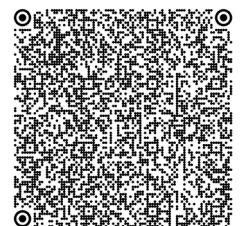
ABSTRACT

Purpose: In higher education institutions and scientific institutes, works are carried out to improve activities by implementing various ideas of the quality of education, treated as newer and more effective forms of ensuring a higher degree of mastery of knowledge and skills in performing the learned profession.

Design/methodology/approach: Those graduating from academic institutions should be problem-solvers and critical thinkers, prepared for lifelong learning. Those qualities are particularly at risk in the modern world, where the flood of information marginalises reflective and especially critical thinking, which are desirable as future competencies. Therefore, if one talks about the quality of education, one must ask oneself whether such competencies are being formed and try to answer them by assessing the quality of the education offered from such a point of view. The systems proposed in the article for quality assurance should be able to capture and assess the features by focusing on evaluating the features of educational programmes and methods.

Findings: Graduates of scientific institutions, including universities (colleges), should be problem-solvers and critical thinkers, prepared for lifelong learning. These qualities are particularly at risk in the modern world, in which the flood of information causes the marginalisation of reflective and critical thinking, which are desirable as future competencies. Therefore, if one talks about the quality of education, one must ask oneself whether such competencies are being formed and try to answer them by assessing the quality of the education offered from such a point of view.

Research limitations/implications: The proposed quality assurance systems should be able to capture and assess the feature by evaluating the features of educational programmes and methods that prepare graduates for lifelong learning, active participation in society, criticality and self-criticism, problem-solving, innovation, cooperation and good communication.



Practical implications: The article defines the basic concepts related to ensuring the quality of required education. It proposes the use of the EFQM model as a tool for improving the quality of education at universities and research institutes.

Originality/value: Useful tool can be the proposed scheme for improving activities based on the EFQM model.

Keywords: Human behaviour, Safety and health protection, Higher education school and scientific institutes, Quality, Education

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EDUCATION AND RESEARCH TRENDS

1. Introduction

For many years, at every level of education in scientific and school institutions, including universities and scientific institutes, work has been carried out to improve operations through the implementation of various ideas of educational quality, regarded as newer and more effective forms of ensuring a high degree of mastery [1-16].

According to the authors, knowledge in the area of the issue requires clarification of basic concepts and their ordering. Thus, improving activities in the quality assurance of education in higher education institutions and scientific institutions should begin with ordering and clarifying concepts related to the activity.

The first term worth explaining is school. The content of the term has evolved over many centuries. For example, in ancient Greece, the term was used to describe conversations between thinkers and students on any topic and also as a place for teaching. In contrast, in ancient Rome, the term already denoted the primary institution for teaching young people. Today, the term school is used with many different meanings. One of them defines a school as a teaching, educational institution [17]. A higher education institution, on the other hand, is a school that educates academics and the highest qualified workers in specific professions [18]. According to the Law on Higher Education of July 27, 2005, a school of higher education – a university, is a school that conducts higher education in the manner specified in the law [19]. Such an explanation allows both terms (university, college) to be used in parallel.

Another clarification is required for the term: education. It is understood as a set of activities and processes that enable people to both learn about nature, society and culture, participation in their transformation, and achieve the most comprehensive development of physical and mental fitness, abilities and interests [17]. Education is a concept identical

to education. Education is understood in many ways, such as:

- upbringing, education; the totality of activities and processes aimed at imparting knowledge, forming certain qualities and skills [17];
- the totality of activities aimed at adapting a person to life in society, upbringing in terms of intellectual, moral and mental aspects; education [20];
- educational service is referred to as a product, a commodity that can be purchased with money and/or with some effort [21].

Education is the primary goal of a university. Each of the management, administrative, or research and teaching processes carried out at the university serves the main process, which is the process of education or teaching. They are all closely dependent on each other, and a strong synergy effect is noted between them.

Each university – college must also meet the requirements placed on it, which are inherent in the quality of the educational service.

Another term that needs clarification is quality. Terminology in the field of quality has developed dynamically in the world since World War II. The pioneers in the area were Americans W.A. Shewhart, E.W. Deming, J.M. Juran, P.B. Crosby, and A.V. Feigenbaum, who generally defined quality as compliance with requirements [22].

Given the general definition of quality, it can be assumed that the quality of a university is the degree to which it meets the growing demands of the environment and helps the development of students while taking care of the continuous development of scientific and teaching staff through the provision of educational services. At the same time, it is important to remember that educational services are characterised by typical features attributed to services. The typical characteristics of an educational service are shown in Table 1.

Table 1.
Features of the education service

No.	Feature name	Feature characteristics
1	Immateriality	It involves the student's acquisition of knowledge, a skill that is not material in nature.
2	Dependence of the buyer on the service provider	There is a strong influence of the university on students' attitudes, habits, awareness, and knowledge. It can mean a difficult confrontation and a barrier to gaining a fully objective opinion of the service.
3	Simultaneous provision and consumption of the service	While providing and consuming the service at the same time, it makes it difficult to retract and rectify mistakes made during the education or upbringing process.
4	The need for capacity and service infrastructure to be in place before service provision can begin	The necessity for the existence of service potential and infrastructure before the service is provided is linked to the proper prior selection and verification of the scientific and teaching staff and management of the institution or unit of the university, as well as the preparation of technical equipment that allows for the smooth conduct of the teaching and scientific processes carried out.
5	Buyer's risk of trust in universities	The buyer's risk having to do with trust in the university allows the student to enter the university with the confidence that he or she will be properly prepared for life there and equipped with the knowledge, competence, experience to get the right job.
6	High differentiation and individualization of individual services	The differentiation and individualisation of individual services are due to the profile, form of activity, form of ownership (vocational, private, public, art, economic, agricultural universities, etc.), scholarship programmes, international exchanges, degree of preparation and commitment of staff.

2. Quality of higher education

The concept of quality is a term that, like the concept of school, has accompanied humankind since ancient times. The concept is difficult to define due to its complex nature and various interpretations. The difficulty is due to the many shades of meaning that the word obtains in different contexts. Professionals in various industries deal with the issue, affecting everyone. It boils down to the situation that each user has his/her view of the quality issue. Everyone knows exactly what quality is, but finding one general definition of the concept that could satisfy everyone seems impossible. Quality professionals define quality as compliance with requirements [23].

In the modern view of quality, simply achieving compliance with requirements is no longer enough. Quality improvement must be pursued. Quality improvement refers to actions taken within the entire organisation to increase the effectiveness and efficiency of those activities and processes and provide additional benefits to both the organisation and its customers [24]. Thus, the concept of university quality should be related to the quality of services defined by the customer's satisfaction – the student. Hence, quality improvement should be related to better alignment of the educational service with the expectations of students. There is no single official document that comprehensively defines the objectives of the quality assurance system [25].

In practice, the quality of a university is the result of the involvement of the entire university (research and teaching

staff, administrative staff and students), the right quality policy and strategy, and the effectiveness and efficiency of processes and systems (Fig. 1), and management by quality (Total Quality Management) is the right approach to the issue.

The term management through quality (TQM) was introduced into the literature in Polish by E. Kondlarski and A. Tyszkiewicz [22]. Using the above experience in relation to a university treated as an organisation, improving the quality of a university should be a continuous process, within which four basic sequences should be distinguished: planning, implementation, evaluation, and correction. Those sequences can be presented in the form of the Shewhart cycle described by Deming [26]:

- The planning phase of quality improvement, which is the primary task of university management. In practice, it should consist of the continuous definition of new goals and tasks related to implementing those goals.
- The implementation phase, which is a set of activities leading to the established goals. The university's management should organise the administrative side of recording data on the activities performed.
- The evaluation phase, which is understood as the development of an effective data recording system, allows comparing the degree of implementation with the established goals. It makes an objective assessment of the collected data. The evaluation usually reveals those areas in the system where it would be desirable to introduce corrective measures due to the deviations that occur. It requires the university's management to make operative decisions and concrete action.

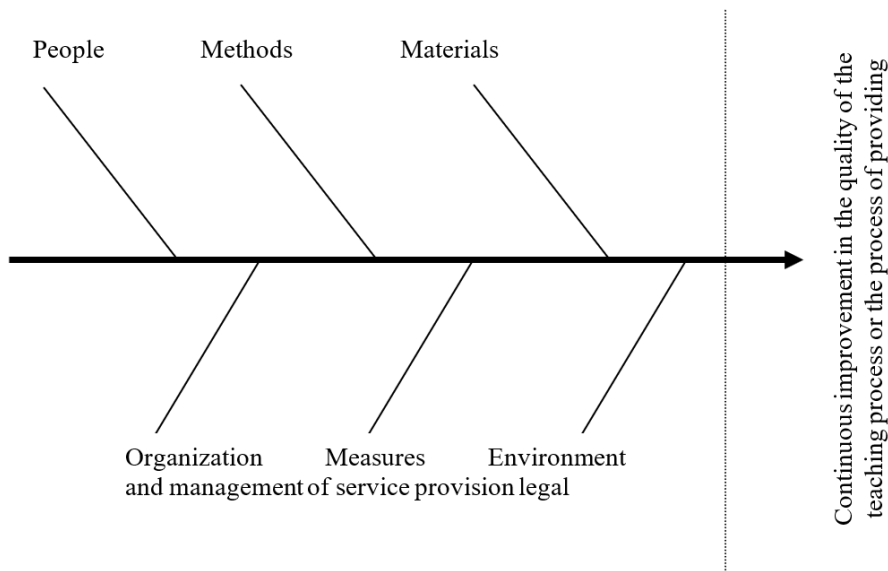


Fig. 1. Potential areas for improving the quality of the organisation – universities

Table 2.

Typical contents of higher education self-evaluation categories included in the questionnaire prepared for the Accreditation Commissions

No.	Cat.	Category content
1	The school, its resources and structure	Quality standards for the school, its resources and structure include requirements related to related to the school's having a mission and strategies in line with the goals and needs of higher education. Those standards also relate to the school's possession of adequate teaching and scientific research infrastructure, having the necessary personnel resources to achieve its goals, and achieving a stable financial situation that guarantees the fulfilment of the of its commitments to education. The requirements in question are checked by assessing the compatibility of the school's mission with the needs of the region and the country in the field of higher education, as well as by analysing the school's strategy and strategic goals in terms of their implementation in relation to the school's mission. The feasibility of the school's development plans and the school's ability to provide the necessary conditions for its operation and the implementation of the educational process at a high-quality level are also evaluated. Important factors in such an assessment include checking the nature of ownership relationships regarding the school's material resources and the relationship between the school's founder and its bodies and the way it operates. Both of those factors should guarantee the possibility of sustainable and stable operation of the school while respecting the principles of its autonomy expressed, among other things, in the appropriate powers and role of collegiate and single-member bodies. The evaluation of those factors is served by an analysis of the school's material resources, its organisational structure, and an analysis of the composition, powers and rules for the election of school bodies. Among the requirements of the standards is a consistent effort to improve the quality of the educational process carried out at the school. Fulfilment of the requirement is assessed on the basis of an analysis of the school's history, its efforts (or lack thereof) to obtain accreditation and certificates. The subject of evaluation is also the effects of these efforts in the form of reports from accrediting and certifying institutions and the opinions of the school's supervisory bodies. An important requirement of the quality standards is the development of the academic environment through activities for the integration of the school's community and the development of the personality and culture of its students. The subject of evaluation in this regard is the documented activities undertaken by the school and the forms and scope of its activities. Assessment of the quality of the teaching process is also based on an analysis of the composition, structure and forms of employment of the school's scientific and teaching, engineering and technical staff and administrative staff of the school.

No.	Cat.	Category content
2	The position of the school and its links with the environment	<p>The position of a higher education institution in the market of educational services is determined by its authority to provide education (at a certain level, in certain majors and specialisations and specialties), as well as the right to confer degrees and apply for the awarding of academic titles. In addition, the position of a university is influenced by the activity and authority of its employees in the scientific and non-scientific community.</p> <p>The need for continuous and interactive partnerships with the world of the economy (employers) and the world of work (professional circles and associations) stems, among other things, from the university's need for openness, innovation, and entrepreneurship, but also from its need to seek additional sources of funding. The various forms and planes of cooperation of a university with its environment, with other universities, with the state, with business practice; its limitations; the existing network of institutions co-creating the university's environment is a test of its readiness for such a cooperation.</p> <p>The university should maintain and develop ties with the economic world through, among other things, the participation of the school's staff in development work and consulting projects, inviting prominent practitioner specialists to give lectures or teach selected classes. It should actively participate in the work of educational improvement organizations and associations. It should maintain and develop cooperation with other like-minded units in the country and abroad to improve the quality of programmes, by inviting specialists to lecture, exchanging lecturers and student groups, organising seminars and conferences. The university should have a plan for such a cooperation.</p> <p><u>The university should also undertake cultural activities for the benefit of the environment in which it operates.</u></p>
3	Recruitment of candidates and students	<p>The system adopted for recruiting candidates for studies has a major impact on the implementation of the educational process and its effect in shaping graduates with the desired silhouette. The school should clearly specify the criteria for the admission of candidates and introduce a system for their selection, according to the principle that the quality of a school is largely determined by the degree of difficulty of becoming its student. The school's policy for determining tuition fees is a component of many factors that should be taken into account in determining the financial conditions of study. High tuition fees create a financial basis for the operation of the school, which should be used to invest in its material and personnel resources, resulting in an increase in the quality of education. Payment of tuition triggers claims from some students about passing subsequent stages of study and obtaining a diploma. The school, caring for its financial revenues, must not give in to the type of attitude, but should set clear substantive requirements and, enforcing them, make the necessary selection (and of candidates for study and students). The financial component of the conditions for studying at a university should be scholarship systems, taking into account both the social situation of students and their academic performance.</p> <p>The activities of the university should take into account the tasks of educating young people, in particular by shaping their social attitudes, behaviour, personal culture, ethics. The school should create conditions for students to have a fairly comprehensive personal development beyond the areas related to the course of study. A specific role in the regard can be played by cultural activities, as well as sports and recreational activities. Of particular importance, however, is the development of student self-government and the activity of scientific circles, within which students should have the opportunity to acquire independence and a range of other skills.</p> <p>The school should provide students with a certain amount of freedom to undertake additional studies, expand their qualifications in extra-curricular activities, take internships, establish contacts with students from other universities. <u>Of particular importance in the regard is foreign exchange.</u></p>
4	Alumni	<p>A school's image is largely shaped by the careers of its graduates. Maintaining ties with alumni is one element of the school's system of communication with its environment. Building relationships with alumni is important because information about their participation in professional and social life (employment/unemployment, careers, and the usefulness of the knowledge gained during their studies) allows for the evaluation of the effectiveness of education and the identification of mechanisms leading to discrepancies between education and employment policies. Accepting responsibility for the effectiveness of education, for the fate of its graduates, therefore, means being open to signals from the labour market to feedback from graduates, from institutions that mediate their employment, from employers. Planning the direction of education also requires the university and its cooperating institutions to track and analyse the</p>

No.	Cat.	Category content
4	Alumni	<p>situation in the local and regional labour market. Building ties with graduates is also based on the assumption that they can continue to perform various important functions in the life of the university, mainly related to its promotion and development.</p> <p>A systematic multi-year study of the careers of selected groups of graduates and selected groups of employers, as well as the maintenance of good relations with all graduates and employers should be part of the system of internal evaluation of the quality of education at the university. Activities to maintain contacts and cooperation with alumni and others of a promotional and integrative nature should be the responsibility of a specially established unit for the purpose (Career Office, Promotion and Development Centre, Promotion Office, Alumni Association).</p>
5	Educational programs and their implementation	<p>The formation of a graduate with specific knowledge and skills requires the school to develop a clear educational concept. It should be based on providing students with the latest advances in knowledge. It is important to pay attention to the introduction of appropriate interrelationships between subjects that allow a comprehensive grasp of phenomena and problems. As part of the overall concept of education, there must be a correspondingly large contribution of students' own work. With regard to master's degree courses, it is important to link the teaching process with the school's scientific and research activities. On the other hand, for undergraduate majors, it is important to form professional skills in close connection with business practice. The school should have a system for shaping curricula that takes into account initiatives put forward by academicians, entrusting the authorship of programs to the most competent of them, making arrangements for programs, reviewing and approving them. Lecturers should develop syllabuses of subjects, and the implementation of programmes should be supervised by superiors. Programmes should be periodically reviewed, and necessary changes made.</p> <p>The educational programme for a given course should be coherent and comprehensive. Layout, subject content, dimension of hours, sequence of subjects, recommended literature are critical to the quality of education. It is necessary to provide a certain freedom of choice of subjects, specialisations, seminars, etc.</p> <p>An important role in the formation of the graduate's silhouette is played by the graduation seminar, through the opportunity to work directly with the promoter, to develop interests in a narrow field relating to the subject of the thesis, to acquire workshop skills in the preparation of independent studies.</p> <p>The curriculum should enable students to become proficient in one language at the undergraduate level and two at the graduate level. Students should also acquire computer skills and master applications related to their field of study.</p>
6	Organization of studies	<p>Studies at a university should be organised in such a way as to ensure the most efficient use of students' time at school. They should also create conditions for real study, by which is meant, among other things, cooperation between students and lecturers, the possibility of flexible construction of the study path and also institutional support for the best students.</p> <p>For the evaluation of the school, both numerical characteristics (number and structure of students) are important here, as well as those that testify to measures for the organisational efficiency of education and the creation of a friendly studying climate. Those include the organisation of the academic year and the even distribution of classes, the legibility of procedures for evaluating academic performance, as well as the provision of information to students about the content of the subjects taught (syllabuses) and the rules for passing them.</p>
7	Teaching methods and techniques	<p>The school is expected to have a whole range of its own methods for activating students and employees in the educational process. These can be both formalised, such as those related to the European Credit Transfer System (ECTS) and the grading system recommended there, or the internal university ranking systems and the related scholarship system, as well as others – less formal, such as study circles, access to attractive internships, specialisations or seminar groups. Preparing graduates for life in an information (knowledge) society requires the use of information technologies in the educational process, especially in the computerisation of educational programmes, or the inclusion of those technologies in the methodology of the implementation of individual subjects. Access to them should be provided to research and teaching staff and students in all computer laboratories. Their use by employees and students should be reflected in the scientific, control, project and diploma works they carry out.</p>

No.	Cat.	Category content
8	Teaching infrastructure	<p>The university should have its own teaching infrastructure tailored to the number of students, majors and forms of instruction. Laboratory equipment (especially computer equipment) should allow individual student work at the laboratory station. The number of computers available to students should be no less than 5 percent of the total number of students. The number of computer application licenses necessary for the teaching process should correspond to the number of computers made available to students. The student should also have access to the Internet from each terminal.</p> <p>It is expected that the university has its own library, whose resources are adequate to the fields of study and the number of students, and which is also accessible to outsiders. The library's resources should grow steadily, and the university's investment in these resources should account for a minimum of 1 percent of its budget. In addition to classic (printed) textbooks and journals, it should collect multimedia resources and have access via the Internet to electronic journals.</p> <p>The public reading room should have a number of seats equal to at least 1 percent of the number of all students. Students are expected to have access to textbooks and scripts in classic as well as electronic form.</p> <p>The size, structure, accessibility and organisation of the work of the dean's office, as well as its equipment, should enable efficient service to students and teaching staff. If the work of the dean's office is significantly automated, the student should also have access to it via the Internet (applications, decisions, grades, account balances, etc.). The rate of availability of a dean's office employee to a student during the academic year should not be less than 1 hour/per student (including the deans' office hours).</p>
9	Research and teaching staff and their development	<p>The quality of education is significantly determined by the lecturers, their teaching and research achievements, the time they devote to teaching, the degree of identification with the school. From an institutional point of view, a fundamental issue is the selection of lecturers (attracting the best) and providing them with good working conditions, as well as the stability of the research and teaching staff at the university. In the context, it is not only the numerical parameters that characterise the collective of university teachers and their individual qualifications that are important, but also the system that ensures the professional development of lecturers, their participation in the life of the school, clear procedures for evaluating performance and the promotion system.</p>
10	Scientific and research activities	<p>The quality standards for the school's scientific and research activities include requirements related to the role of the school's scientific research, and concern its subject matter, sources of funding and effects. Scientific research should be conducted at the school, while its scope and nature should be consistent with the school's mission. The school should have and implement a scientific policy and use effective instruments for managing scientific activities.</p> <p>The school should take active steps to obtain research funding from domestic and foreign sources and conduct research and development work in cooperation with practice. The school should cooperate in scientific research with other academic centres, while its scientific and implementation achievements should be properly documented. Conferences and scientific seminars organised at the school and the participation of the school's staff in scientific undertakings organised in other centres are important forms of developing scientific research and scientific cooperation.</p>
11	School management system	<p>The management system of any modern higher education institution should allow, in addition to the implementation of statutory tasks, as well as extensive cooperation with the local environment and with universities and domestic and foreign institutions, introducing it into the circle of those institutions that are responsible for building in Poland and Europe an information, information society and in the further future a society of knowledge. Increasing with each year the amount of information that flows into the university, as well as is generated within it and output to the closer and further surroundings, causes that the management system should enable the efficient processing of the information and its management, and ultimately also enable the management of knowledge as that value of the institution, which in the knowledge society will determine its position. In the regard, the university's management system is expected to have the following features:</p>

No.	Cat.	Category content
11	School management system	<ul style="list-style-type: none"> • the formal structure resulting from the statute (or higher-level legal acts) and organisational regulations and the structure of the actual system are compatible with each other, • the management system is based on an integrated information system, • the system allows for the continuous growth of the information (knowledge) resources collected at the school electronically, • the system allows for the use of Internet resources by students and employees, • the school has a website (portal) that contains most of the information necessary for the environment and students, • the system allows for the implementation of the policy of continuous improvement of the quality of education and possible improvement of the quality of the research carried out.

The quality of the educational service evidences the quality of a university. The educational service of a higher education institution, and thus its quality, should be looked at in a multifaceted way. It can be evaluated elementarily – then the focus should be on analysing the quality of the educational process within a single subject, and globally – attention should be focused on all the educational processes carried out at a given university or its faculty. One can also analyse the service and its quality in relation to a student group (exercise, laboratory, seminar). One can evaluate the process from the collective angle – depending on the nature of the collectivity (students of a particular department, students of a particular course, speciality, groups of students from an individual course of study, postgraduate students, etc.).

Some of the most common tools used in higher education to examine the quality of the educational service are:

- student evaluation of teaching activities,
- hospitalisations of teaching classes,
- teacher's performance evaluations,
- evaluation of the administration's work,
- operational reviews (of programmes, processes, personnel, training, finances, H&S),
- activities monitoring the fate of graduates,
- various types of self-assessments of activities.

In the higher education system, the best-known self-evaluations used to date were reports prepared for the Accreditation Commissions. They provided the Accreditation Commission and the Evaluation Team with information on all aspects of the school's activities in arranging the adopted quality assessment standards. Self-assessment was also a tool used by the school to improve its solutions, procedures and development of material and human resources. It enabled a systematic review of the school's organisation and operation based on the standards adopted by the higher education community interested in high-quality education. The proper conduct of the self-assessment and the preparation of the resulting questionnaire was also an important indication for the evaluation team of the school's approach to accreditation and the ability to analyse all areas of its operations critically.

According to the authors, the information contained in the self-assessment questionnaire prepared by the school provided a reference to all accepted standards for assessing school quality. The developed self-assessment questionnaire was the primary source of information about the school in the following categories:

- the school, its resources and structure,
- the position of the school and its ties to the environment,
- candidate recruitment and students,
- graduates,
- education programmes and their implementation,
- study organisation,
- teaching methods and techniques,
- teaching infrastructure,
- research and teaching staff and their development,
- scientific and research activities,
- school management system.

The content of each category is shown in Table 2.

The reports prepared for the Accreditation Commissions contributed to ensuring the quality of education, as their main purpose was for the accreditation body to recognise that an educational institution or field of study is credible and that the educational offerings meet the requirements adopted in the educational standards [27].

Such a procedure, however, may have caused the college to "stop" at a level of quality enforced, at most, by meeting certain educational requirements [28]. In order to prevent it, a follow-up procedure should be developed. The EFQM model can be a useful tool in developing the procedure.

3. The EFQM model as a tool for improving the quality of a higher education institution

The creator of the EFQM Model is the European Foundation for Quality Management (EFQM). The organisation was founded in 1988 on the initiative of 14 leading European companies, which recognised that

applying comprehensive quality management allows them to gain a competitive advantage in the business world. The foundation has 750 members, including large corporations (ABB, British Telecom, Ericsson, Deutsche Bank, Nestle, Renault, Xerox, Volvo), small and medium-sized enterprises and public institutions. The mission of the EFQM foundation is to stimulate and support activities to achieve sustainable excellence by European organisations.

The EFQM model is based on the premise that excellent results in terms of business performance: customers, employees and society are achieved through leadership that drives policy and strategy, which is implemented through employees, partnerships, resources and processes.

The EFQM model is a practical tool that can be applied in various ways in relation to a university treated as an organisation.

- as a self-assessment tool to measure where the university is on the road to excellence and to help understand shortcomings and find solutions;
- as the basis for a common set of concepts and a way of thinking about the university adopted by the various functions of the organisation;
- as a structure to position existing initiatives, remove duplication and identify gaps;
- as a structure for the university's management system.

The model covers all the most important areas of the university's operation and specifies exactly what requirements should be met in those areas. In this way, the model serves as a comprehensive self-assessment tool and,

simultaneously, as a model of excellence to strive for by taking appropriate measures in each of the highlighted areas.

Self-assessment makes the university aware of its strengths and identifies areas for improvement. The EFQM excellence model allows multiple approaches to achieve sustainable excellence in all aspects of the university's operations.

A practical feature of the model was its universality, i.e., the possibility of using it in any university, regardless of type, size, or field of study [29].

The EFQM model is based on the premise that excellent performance in terms of business, customers, employees and social impact is achieved through leadership, being the driver for strategy policy formulation; management of people, partnerships, resources and processes. The model has a framework structure consisting of nine criteria. Five of these are referred to as potential, and four as results. The potential criteria cover the activities undertaken by the university, while the results criteria cover its achievements. Results are the effect of potential, and potential is improved using performance measurement feedback. A diagram of a sample EFQM model for a university is shown in Figure 2.

The RADAR logic circuit forms the heart of the EFQM Model. The circuit is built from four elements:

- results (Results),
- approach (Approach),
- implementation (Deployment),
- assessment, review (Assessment and Review).

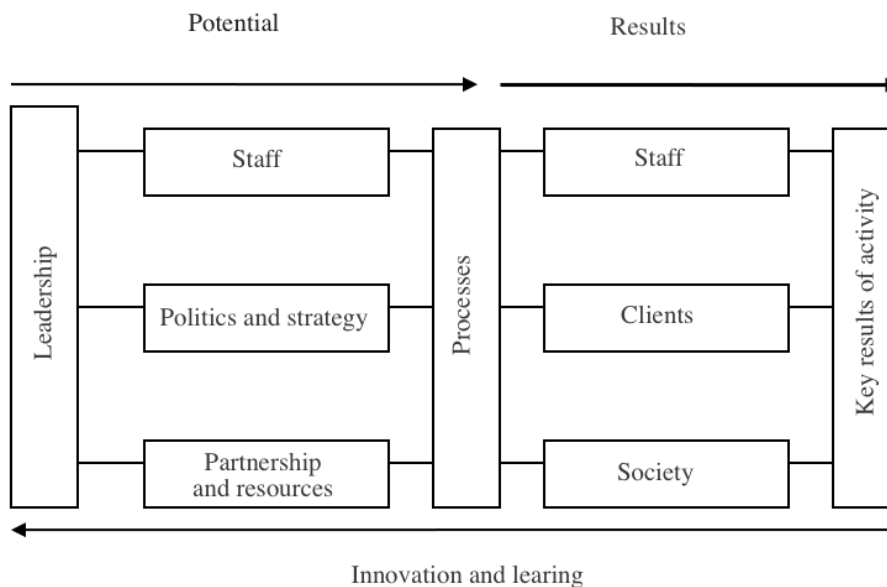


Fig. 2. Example diagram of the EFQM model for universities [30]

RADAR logic indicates that the university must:

- 1) determine the results it seeks to achieve as part of its policy and strategy-making process. Those results include the university's performance in both financial and operational areas and its stakeholders' perceptions;
- 2) plan and implement a consistent set of robust approaches to get the required results now and in the future;
- 3) implement the approaches systematically to ensure their full application;
- 4) evaluate and review the approaches used based on monitoring and analysing the results achieved and continuous learning activities, and identify improvements, prioritise them, plan for them and implement them wherever needed.

The creators of the EFQM Model recommend that for each of the POTENTIAL and RESULTS sub-criteria, RADAR logic elements should be included.

EFQM analysis allows building a model for improving the quality of a university (Fig. 3). The model consists of nine criteria in two categories such as capacity (leadership, policy and strategy, staff, partnerships and resources, processes) and performance (student and stakeholder performance and satisfaction, teacher and staff performance and satisfaction, cooperation with the environment, final results).

3.1. Leadership

Excellent leaders are the leaders (rectors, deans of departments, directors of institutes) who create and enable

the mission and vision of the university. They develop and implement the organisational values and systems required for sustained success through appropriate actions and behaviours. During periods of change, they maintain constancy of purpose and, when necessary – are able to change the direction of the university and inspire others to move in that direction.

Leaders should:

- 1) create a mission, vision, values and ethics, and be a role model for a culture of excellence;
- 2) be personally involved in the creation, implementation and continuous improvement of the university's management system;
- 3) interact with students, teachers and staff and representatives of the public;
- 4) strengthen the culture of excellence together with the university's studios and students;
- 5) identify organisational change and enable its implementation.

3.2. Policy and strategy

Excellent universities implement their mission and vision by developing a stakeholder-focused strategy. The strategy takes into account the market and the education sector. Policies, goals and processes are developed and implemented to carry out the strategy.

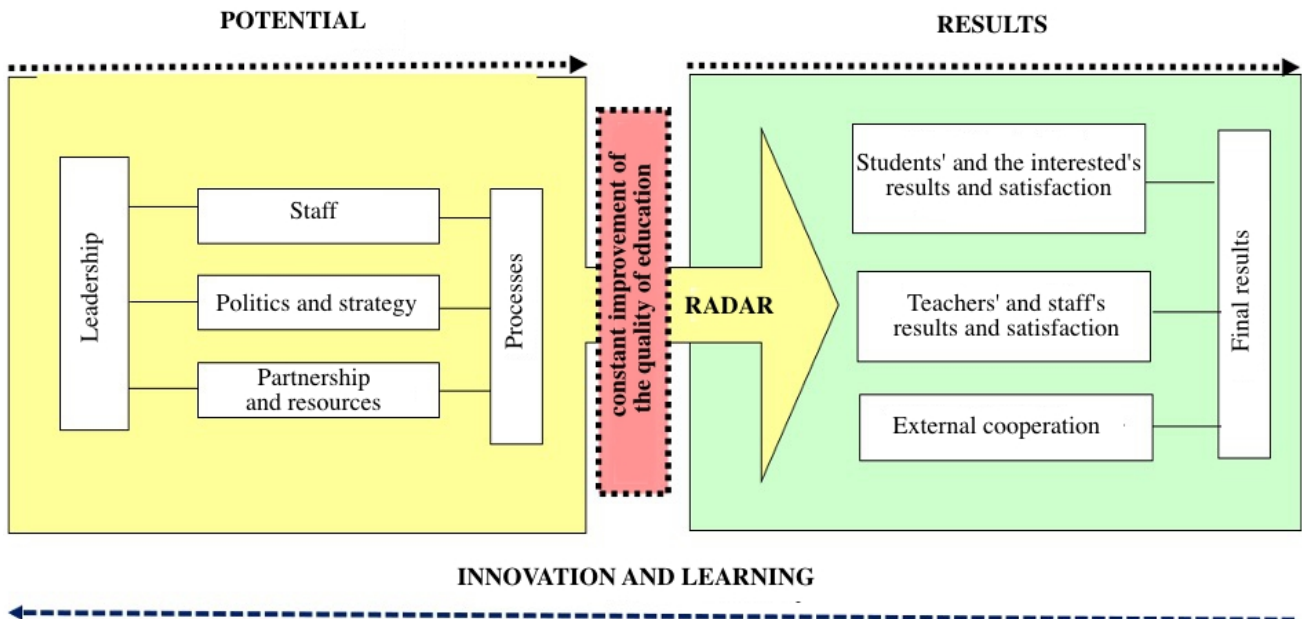


Fig. 3. Quality improvement model of a higher education institution. Source: own elaboration based on [30]

Policy and strategy should:

- 1) be based on the current and future needs and expectations of all stakeholders in the operation of the university;
- 2) be based on information obtained from activity measurement, research, learning and external sources;
- 3) created, reviewed and updated;
- 4) be communicated and implemented through the structure of key teaching processes.

3.3. Employees

Excellent universities develop and unleash the potential of their employees at the individual, team and university-wide levels. Those universities promote the principles of fairness and equality, engage employees in action and empower them. They take care of their employees, communicate with them, reward them and express appreciation to them in ways that motivate them and make employees committed to using their skills and knowledge for the good of the university.

An excellent university should:

- 1) plan, manage and improve human resources;
- 2) identify, develop and consolidate the level of knowledge and competence of employees;
- 3) engage employees in activities and empower them accordingly;
- 4) stimulate dialogue between the management of the scholar, her staff, students and representatives of the public;
- 5) take care of its employees and students, reward and express appreciation to them.

3.4. Partnerships and resources

Excellent universities plan and manage their relationships with external partners and internal resources to support the implementation of strategies and policies and ensure the effectiveness of teaching processes. In planning and managing partner relationships and resources, those universities balance their current and future needs and those of the community and environment.

An excellent university should manage:

- 1) relationships with external partners;
- 2) finances;
- 3) buildings, equipment and materials;
- 4) technology;
- 5) information and knowledge.

3.5. Processes

Excellent universities design, manage and improve their teaching processes to fully meet the needs and provide increasing value to students and other stakeholders.

An excellent university should:

- 1) systematically design and manage their processes;
- 2) improve processes as needed, innovating to fully satisfy and provide greater value to employees, students and other stakeholders;
- 3) design and provide teaching services;
- 4) develop and manage relationships with students.

3.6. Results and satisfaction of students and stakeholders

Excellent universities measure comprehensively and achieve outstanding results in relations with their students.

An excellent university should:

- 1) establish measures of perception;
- 2) establish and measure the results of operations.

3.7. Performance and satisfaction of teachers and staff

Excellent universities measure comprehensively and achieve outstanding results in relations with their teachers and staff.

An excellent university should:

- 1) identify measures of perception;
- 2) record business performance indicators.

3.8. Cooperation with the environment

Excellent universities measure and achieve better results in their public relations; they determine the results of activities and record performance indicators.

3.9. Key results of operations

The key performance criterion makes it possible to assess the university's past performance and, consequently, to enable further improvement of its activities through innovation and learning.

4. Conclusions

Graduates of scientific institutions, including universities (colleges), should be problem-solvers and critical thinkers, prepared for lifelong learning. Those qualities are particularly at risk in the modern world, in which the flood of information causes the marginalisation of reflective and critical thinking, which are desirable as future competencies. Therefore, if one talks about the quality of education, one must ask oneself whether such competencies

are being formed and try to answer them by assessing the quality of the education offered from the point of view. The proposed quality assurance systems should be able to capture and assess the feature by evaluating the features of educational programs and methods that prepare graduates for lifelong learning, active participation in society, criticality and self-criticism, problem-solving, innovation, cooperation and good communication. Such a useful tool can be the proposed scheme for improving activities based on the EFQM model.

References

- [1] J. Brdulak, Quality assessment of HEIs in Poland: Problems and recommendations, *Science and Higher Education* 2/48 (2016) 81-94 (in Polish).
- [2] E. Chmielecka, N. Kraśniewska (eds), *Education for the future - quality of education*, Polish Rectors Foundation, Warszawa, 2019 (in Polish).
- [3] E. Chmielecka, A. Żurawski, Quantity and quality – difficult paths to ensuring the quality of education in Polish higher education, in: J. Woźnicki (ed), *Transformation of Academic Higher Education in Poland during the 30-year period 1989–2019*, KRASP, Warszawa, 2019, 141-162 (in Polish).
- [4] A. Dąbrowicz-Tłałka, M. Musielak, Building the educational strategy of the university taking into account the use of e-technology – conclusions from the analysis of technical university experiences, *The Scientific Papers of Faculty of Electrical and Control Engineering Gdańsk University of Technology* 72 (2021) 19-24 (in Polish). DOI: <https://doi.org/10.32016/1.72.03>
- [5] M. Jelonek, J. Skrzyńska, Quality of education in higher education - introductory remarks, in: W. Przybylski, S. Rudnicki, A. Szwed (ed), *Evaluation of the quality of teaching in higher education. Methods, tools, good practices*, Tischner European University Publishing House, Kraków, 2010, 11-33 (in Polish).
- [6] A. Korybski, The quality of education in higher education (a perspective of an organisational game), *Criticism of Law. Independent Law Studies* 10/2 (2018) 149-167 (in Polish). DOI: <https://doi.org/10.7206/kp.2080-1084.196>
- [7] J. Obolewicz, A. Baryłka, Life cycle engineering of a construction object, *Safety Engineering of Anthropogenic Objects* 3 (2021) 11-20. DOI: <https://doi.org/10.37105/iboa.115>
- [8] J. Obolewicz, A. Baryłka, Interpersonal communication in construction management engineering, *Safety Engineering of Anthropogenic Objects* 1 (2022) 39-45. DOI: <https://doi.org/10.37105/iboa.131>
- [9] K. Przystupa, The quality of education in higher education institutions, *Buses* 12 (2017) 1770-1775 (in Polish).
- [10] L. Dzhuguryan, S. Iwan, I. Marchuk, Quality management in higher education based on the educational process monitoring, *Research Reviews of Czestochowa University of Technology. Management* 34 (2019) 38-49 (in Polish). DOI: <https://doi.org/10.17512/znpcz.2019.2.03>
- [11] W. Gos, The quality of education at universities - the voice in discussion, *Folia Pomeranae Universitatis Technologiae Stetinensis* 319(79)/2 (2015) 69-76 (in Polish).
- [12] M. Rocki, The quality of teaching and the economic future of graduates. Case analysis, *Science and Higher Education* 1/51 (2018) 219-239 (in Polish). DOI: <https://doi.org/10.14746/nisw.2018.1.11>
- [13] Ernst & Young Business Advisory and the Institute for Market Economy Research, *Strategy for the development of higher education in Poland until 2020*, Partial report, Warszawa, 2010 (in Polish).
- [14] *System of evaluation of the quality of education in higher schools*, Supreme Chamber of Control. Years 2015-2017, Warszawa, 2018 (in Polish).
- [15] M. Szyluk, Quality management of remote education in universities, *Management and Quality* 4/4 (2022) 359-374 (in Polish).
- [16] *Assumptions to the amendment of the Law - Law on Higher Education and the Law on Scientific Degrees and Academic Title and on Degrees and Title in Art* (2010), Ministry of Science and Higher Education, 2010 (in Polish).
- [17] *Great Encyclopedia PWN*, PWN, Warszawa, 2001 (in Polish).
- [18] *Universal Dictionary of the Polish Language*, PWN, Warsaw, 2005 (in Polish).
- [19] *Higher Education Act of July 27, 2005* (in Polish).
- [20] I. Kamińska-Szmaj (ed.), *Dictionary of Foreign Words*, Europa, Wrocław, 2001 (in Polish).
- [21] D.E. Clayson, D.A. Halej, *Marketing Models in Education: Students as Customers, Products or Partners*, *Marketing Educations Review* 15/1 (2005) 1-10. DOI: <https://doi.org/10.1080/10528008.2005.11488884>
- [22] E. Kindlarski, E. Baginski, *Basics of quality management (TQM)*, Bellona, Warszawa, 1994 (in Polish).
- [23] J.S. Oakland, *Total Quality Management*, Butterworth-Heinemann Ltd, Oxford, 1992.
- [24] *ISO 9004-4, Quality management and quality system elements. Guidelines for quality improvement*.

- [25] Comparative Analysis of European Education System, Eurydice Network, EU, 2023.
- [26] W.E. Deming, Out of the Crisis, Massachusetts Institute of Technology, Cambridge, 1982.
- [27] Recognition of education - a guide, Chapter III.5: Accreditation of educational institutions, Bureau for Academic Recognition and International Exchange, Warszawa, 2005 (in Polish).
- [28] D. Wosik, Criteria for environmental accreditation and the requirements of ISO 9001:2000 - opportunities for integration on the path of improving the quality of education in higher education, in: E. Skrzypek (ed), Quality of education in a knowledge society, UMCS, Lublin, 2006 (in Polish).
- [29] J. Woźnicki (ed), Transformation of Academic Higher Education in Poland during the 30-year period 1989–2019, KRASP, Warszawa, 2019, 141-162 (in Polish).
- [30] E. Chomac, The EFQM model of excellence in the concept of management, Problems of Quality 35/8 (2003) 19-22 (in Polish).



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