Integrated quality management systems

From institutional assessment to quality enhancement

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Name of Author(s)

Marta Pile
Ana Torres
Alexandra Pontes

Contact Details

Marta Pile
Instituto Superior Técnico
Tecnico Lisboa Institutional Studies and Planning Office
Av. Rovisco Pais, n. 1
1049-001 LISBOA
Portugal
E-mail: marta.pile@tecnico.ulisboa.pt

Abstract

Integrated quality management systems: from institutional assessment to quality enhancement

In order to enhance educational excellence, and in accordance with the European and Portuguese guidelines for quality assurance, Instituto Superior Técnico (Tecnico Lisboa) has invested in the development of an Integrated Quality Management System (SIQuIST).
Although this system is well established within the institution, by responding to the challenges outlined above, a number of questions were raised:
1) Is SIQuIST contributing to more transparency?
2) What impact has this quality management system on Tecnico Lisboa?
We find that SIQuIST is vital for the institution's accreditation processes, contributes towards more transparency, provides information for conscious strategic decisions, and enhances the institution's performance.

Presentation

Integrated quality management systems: from institutional assessment to quality enhancement

1. **INTRODUCTION**

The expansion of higher education institutions (HEIs) over the last decades, together with an increasing demand for skills and competences, resulted in a major shift in the educational provision:

- the sector has diversified its programs, subjects and links with industry (Teichler 2007);
- reasons for students to enrol in higher education (HE) became more diverse and, besides including their own interests, started also comprising labour market expectations or company's needs (Little & Williams 2010);
- accountability in universities has increased, stimulated by employer concerns, and questions about the value that education provides to students (Leveille 2006);
- higher education institutions became more diverse in their mode of educational provision including growth of internationalisation and digital learning (European Commission 2013);
- the citizens became increasingly aware of their rights, and as a consequence there was a demand for quality (Santos 2011).

As higher education systems became more complex, they were forced to seek for guidance mechanisms that would allow their adaptation to change in a shorter 'administrative time' (Neave 1998) and consequently quality assurance processes became essential. The Bologna Declaration (1999) contributed to encourage European cooperation in the quality of higher education and, in 2005 the European Ministers of Education adopted the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), with the aim to contribute to a common understanding of quality across borders. The document has become a corner stone of this effort and was revised in 2015 to improve its clarity, applicability, and scope.

According to the criteria set in the ESG, institutions should have a policy for quality assurance that should be made public and form part of their strategic management. At the same time, among the underlying principles of this declaration, quality assessments must form part of the institutions' educational culture: internal evaluations should involve all relevant actors, inducing a sense of co-responsibility among the academic community and not merely be seen as an imposition on the part of the academic management or political power (Santos 2011).

Aware of these critical aspects, with the purpose of enhancing the educational excellence within the institution, and in accordance with the European and Portuguese guidelines for quality assurance, Instituto Superior Técnico (Tecnico Lisboa) has invested in the development of an Integrated Quality Management System, known as SIQuIST.

The developments and challenges outlined above raised a number of questions, among which are the following: 1) Is SIQuIST contributing to more transparency? and 2) What impact has this quality assurance system on IST? Starting with a brief reference to the Portuguese Higher Education assessment system, this article presents the main features of the model adopted by Técnico Lisboa for the internal monitoring, assessment and quality promotion of its activities, the methodology used by the school for a meta-evaluation of its Integrated Quality Management System (SIQuIST), and finally, to demonstrate the importance of this system for the institutional management.

2. THE PORTUGUESE QUALITY ASSURANCE SYSTEM

In order to guarantee Portugal's integration in the European higher education quality assurance system, through the evaluation and accreditation of the Portuguese study cycles, the Agency for Assessment and Accreditation of Higher Education (A3ES) was created. Additionally, the decree-law which instituted A3ES (nº 369/2007), also included an important note, which foresees the possibility of certification of internal quality assurance systems: "the obligation for institutions of higher education to create their own systems of quality assurance, which can be certified" (Santos 2011).

According to the Law (Law nº 38/2007), it is the responsibility of higher education institutions in Portugal:
- to adopt quality assurance policies and procedures for their implementation;
- to develop a culture of quality and of quality assurance;
- to promote and implement a strategy for continuous enhancement of quality.

A new legal framework was adopted, which took into account reference documents at European level, such as the ENQA (European Association for Quality Assurance in Higher Education) guidelines. The 4 development priorities for this system were:
- to extend the scope of assessment, covering the performance of institutions and not just their study programs;
- to target the assessment criteria, for comparable results, and clarify the consequences of assessment in what concerns the functioning of programs and institutions;
- to internationalize the assessment process, in particular from the perspective of institutional assessment;
- and to require tangible results, as HEIs should implement their own quality assurance systems, which are likely to be certified.

A3ES is, therefore, responsible for contributing to quality improvement of HE in Portugal, through the assessment and accreditation of HEIs and its Study Programs (SP), assuring compliance with basic requirements of official recognition, while promoting an institutional quality assurance culture.

In order to ensure high standards of HEIs performance, the new quality assurance model followed by A3ES aimed at measuring the degree of compliance of the mission of institutions through performance parameters. In this respect, quality assessment, made through self-assessment and external assessment exercises, is a basis for accrediting HEIs and their SP, ensuring compliance with basic requirements that lead to the official recognition both of HEIs and of their SP.

A3ES itself assumed the principle that each HEI is primarily responsible for its internal quality, and should set up adequate internal quality structures and procedures. In turn, the Agency shall be responsible for conducting audits to certify HEIs quality assurance procedures. Therefore, A3ES started developing broader assessment processes that included certification of internal quality assurance systems, and commitment of adopting simplified accreditation procedures regarding institutions that implement these systems and present performance indicators clearly above legal minimum standards.

3. TECNICO LISBOA INTEGRATED QUALITY MANAGEMENT SYSTEM – SIQuIST

Tecnico Lisboa is the largest faculty of Architecture, Engineering, Science and Technology in Portugal, offering Bachelor, Master, PhD programmes and lifelong training, besides developing Research, Development and Innovation (RD&I) activities. It involves an academic community of over 12,000 people, and it is organised into Governing Bodies, Scientific & Pedagogic Councils, Advisory Board, Administration & Financial Management Services, and Academic Units, according to its mission, vision and goals.

Técnico Lisboa started promoting assessment exercises of its SP in the 1990s, seeking to obtain an effective repercussion in the improvement of processes, program results and faculty performance. Over the years, the purpose was to develop an assessment system that could:

- set up structures and ensure necessary resources for regularly carrying out external and internal assessment of its teaching activities;
- put a simple and effective system in place that could identify, collect, process and disclose information;
- ensure that assessment exercises had visible and timely effects on the (re)formulation of the educational process.

Through regular cycles, all scientific areas of SP offered by Técnico Lisboa were assessed. In response to weaknesses identified in self-assessment processes, different internal and systematic quality control mechanisms have been developed, tailoring the needs identified and the resources available.

Despite all these developments, the need to adapt to the Bologna Process and to the international reality, led to a far-reaching reflection about these mechanisms, which culminated in a broad review of all quality monitoring processes.

Técnico Lisboa reflected internally on its quality policy, towards the development of an Integrated Quality Management System, known as SIQuIST, following the best European practices and covering not only Teaching, but also RD&I, Technology Transfer and all support and cross-cutting activities.
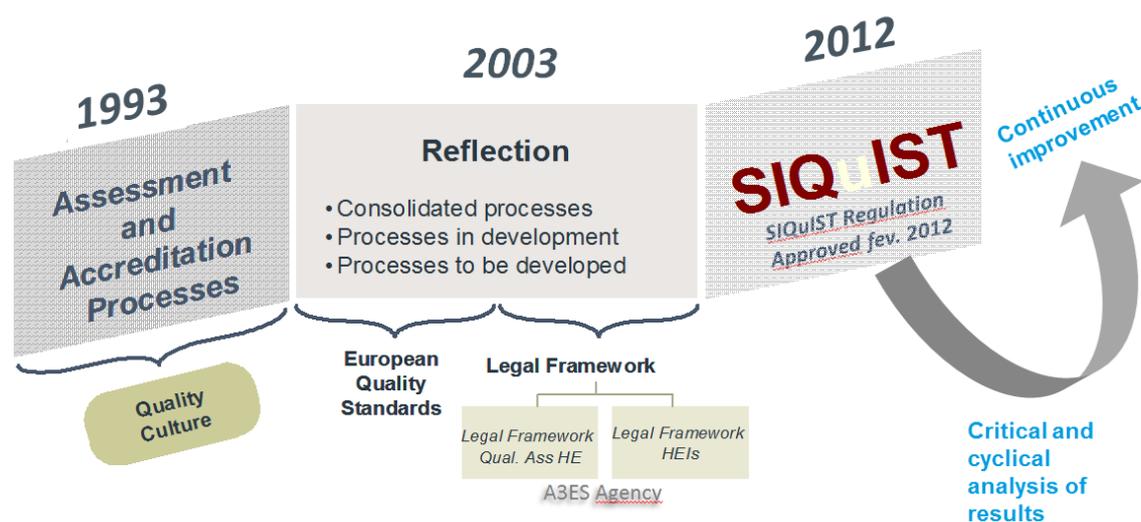

Figure 1 – Técnico Lisboa path towards Quality

Any quality management system should reflect the way an institution controls its activities, through a structure that supports the way planning processes, resources and documents are used to achieve the institution's objectives with certain levels of quality, while promoting the continuous improvement of services provided.

In this regard, the development of SIQuIST sought to identify and integrate the major processes in a trustworthy and effective system, giving an impetus to improvement and readjustment, in real-time, of internal procedures. The SIQuIST is pivotal for the institution's external Assessment and Accreditation processes, by stimulating a global and integrated quality culture, which links the strategic objectives of Técnico Lisboa to its operating goals. Nevertheless, more than responding to external demands, this system ensures updated information on how Técnico Lisboa operates, and helps to create feedback mechanisms to improve performance conditions.

SIQuIST regulations contain a group of assumptions deemed essential to build up any assessment system, in order to:

- set objectives for assessment and assessors;
- get stakeholders involved in decisions regarding assessment processes and policies;
- redress the balance between institutional vs individual needs;
- disclose information on assessment in a clear way (criteria, processes and procedures);
- provide resources for teaching quality promotion and improvement;
- promote assessment regularly and continuously over time;
- use and adapt instruments to specific teaching situations;

- use validated instruments for institutional assessment purposes;
- keep formative assessment separate from summative assessment.

3.1 QUALITY POLICY

Técnico Lisboa statutes establish a commitment to quality assurance in Education, Research and Technology Transfer as fundamental bases for the accomplishment of its mission.

Thus, Técnico Lisboa's quality strategy relies on an institutional development program with formally established milestones in strategic management documents, including actions to be carried out, monitoring tools, deadlines, responsibilities and competences of the different bodies, services and agents involved.
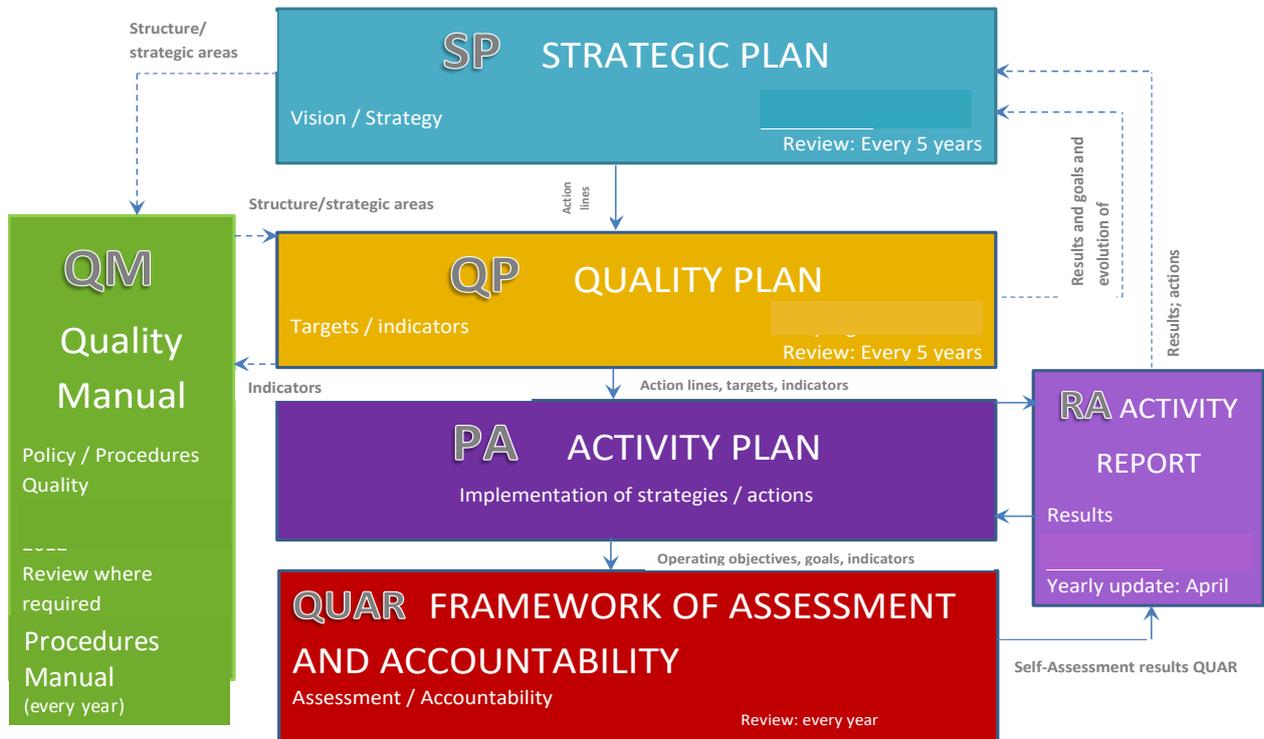
Figure 2 – Strategic management documents of Técnico Lisboa

The quality assurance policy also seeks to stimulate active participation of stakeholders, in order to make activities assessment a common procedure in Técnico Lisboa focus areas.

The focus areas cover the three components of the core missions of the School (Higher Education, Research, Development & Innovation and Technology Transfer), but also include support and cross-cutting areas. Three cross-cutting focus areas are shared by all the core activities of Técnico Lisboa, closely associated with the needs of a global organization (Internationalisation and Communication), and the need to consider a new aspect of the school´s organization, its Multipolar Operation across three distinct faculty complexes.

The core activities depend mainly on its Human Resources, which themselves depend on the support of a number of different areas whose development is addressed in the Strategic Plan: Infrastructure, Processes and Quality, and Information Technology. Finally, all the development strategy rests on adequate and flexible Funding resources, which have to be further developed in order to make Técnico Lisboa as independent as possible from the fluctuations that are inherent in public funding.
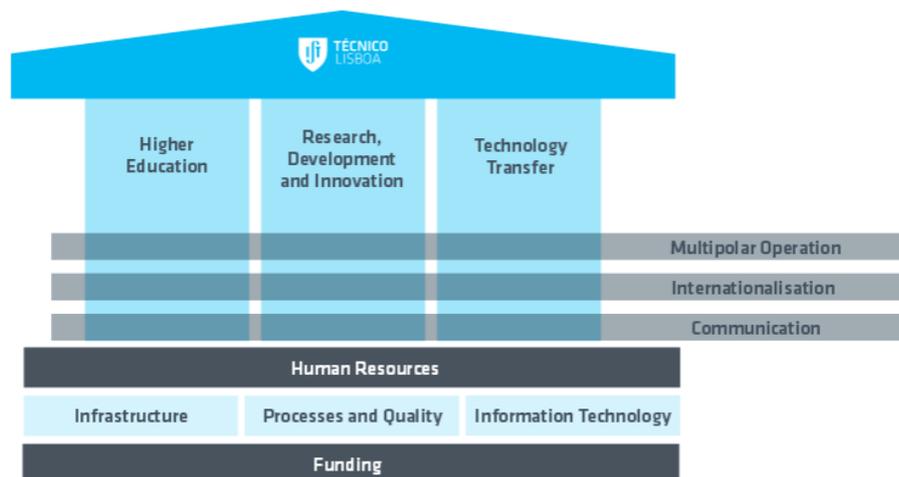
Figure 3 - Schematic representation of Técnico Lisboa eleven strategic focus areas

Every decision and strategic action is monitored and supported by a Quality Plan (QP), which aims at specifying targets and indicators that substantiate the strategy for development, the quality assurance and the continuous improvement of Técnico Lisboa.

But, are we doing the right things the right way?

To measure success, two types of indicators were included in the QP:

- quality indicators, to measure the process, expectations, perceptions, satisfaction, improvement, impact of activities carried out;
- and progress indicators, to measure results, the accomplishment of targets, the achievement of the objectives.

The objectives established for the strategic Processes and Quality focus area, include the development of adequate practices that promote quality in all strategic areas and respective assessment procedures. Together with the consolidation and improvement of methodologies and tools for monitoring and promoting quality, the school should provide wide dissemination and sharing of good practices identified in the various levels of school performance, pursuing the objective of increasing productivity and commitment of the whole community in the implementation of Tecnico Lisboa strategy.

Therefore, six action lines have been defined for Processes and Quality focus area:

- identification, consolidation and dissemination of good institutional practices;
- review/implementation of evaluation processes for Departments, Research Units and Laboratories;
- consolidation of the assessment processes regarding the SP offered;
- consolidation of the internal assessment of faculty, researchers and non-academic staff;
- redefinition and optimization of administrative processes;
- alignment and monitoring Técnico Lisboa positioning in international rankings.

3.2 CERTIFICATION OF SIQuIST

Técnico Lisboa applied for an experimental audit exercise to its internal quality assurance system, held by A3ES. This exercise was coordinated by Técnico Lisboa Quality Management Council, and aimed to promote a reflection on the scope and effectiveness of quality assurance procedures and structures in each of the strategic areas of the school, according to A3ES guidelines:

- to assess the degree of the internal quality system estimated development (insufficient, partial, substantial and very advanced);
- to support this assessment through evidence and examples;
- to identify aspects for improvement;
- to present a SWOT analysis.

To obtain a favorable decision for SIQuIST certification, schools had to reach a minimum appreciation of "partial" in all areas and "substantial development" (at least) in areas like "teaching and learning" and "the system as a whole".

AUDIT AREAS	RESULTS
Teaching and Learning	*Substantial Development*
Research and Development	*Substantial Development*
Links to Society	*Substantial Development*
Information System	Very Advanced
Human Resource Management Policies	*Substantial Development*
Support Services	*Substantial Development*
Publication of relevant information to stakeholders	*Substantial Development*
Internationalisation	*Substantial Development*

Figure 4 – SIQuIST Certification results summary: 2013-2018

In January 2013 SIQuIST was certified by A3ES for a period of six years, and Técnico Lisboa became one of the first four Portuguese HEIs with their internal quality systems certified. Three years later, in 2017, there are ten more institutions, but only eight have a six years period certification.

In addition to the external visibility of SIQuIST and promised simplification of accreditation procedures by A3ES, many other benefits have been identified at Técnico Lisboa, following the certification of its quality system, in particular:

- reinforced commitment of institution's governing bodies concerning quality issues;
- provided an opportunity for involving all leaders of the institution's different strategic areas in a joint reflection on quality monitoring/promotion mechanisms;
- development of new SIQuIST support documents;
- greater visibility for the quality system itself, inside and outside the institution;
- greater transparency and involvement of people in quality processes, establishing better links and information channels on the monitoring processes and quality promotion among stakeholders;
- improvements in students' needs, readjustment of curricular plans and correction of teaching and learning processes;
- availability of valuable information for decisions about retention, promotion, teaching awards or funding;
- systematic feedback from external stakeholders (employers and graduates);
- provided an opportunity to share experiences and clarify doubts among stakeholders;
- the review and reformulation of some bureaucratic and complex processes;

- increased participation of students in the quality management and assessment system;
- greater awareness of the whole institution not only concerning quality assessment/promotion procedures but also concerning their effectiveness: what it is done with the results of assessment processes (corrective measures, improvement plans);
- recognition that external assessment always end up being an encouragement, an additional stimulus to the processes of change and continuous improvement inside the institution;
- acknowledgement that there are neither unique nor ideal quality systems, only benchmarks with minimum requirements from which HEIs should develop their quality system.

4. SIQuIST METAEVALUATION

Taking into account the new paradigm of institutional accreditation, it is expected that A3ES takes into account, in its evaluation criteria, the consistency and effectiveness of the schools' quality systems.

In this regard, and aware of its responsibilities which include the production of self-assessment reports on SIQuIST operation, in 2016 Técnico Lisboa Quality Management Council approved the work plan for reviewing SIQuIST Quality Manual. The work plan included a comprehensive mapping and assessment of the various quality mechanisms developed under the SIQuIST.

4.1 METHODOLOGY

The proposed methodology, which adopts Deming management cycle (Plan-Do-Check-Act, Kanji 1996) for control and continuous process improvement, covers the eleven strategic focus areas of Técnico Lisboa, and aims to identify (for each area):

- coordination structures and strategic guidance;
- documents (e.g. manuals, regulations) establishing the rules and procedures for the implementation of the activities;
- tools for the monitoring and evaluation of results;
- evidence for continuous improvement, with possible action plans and corrective measures.

The mapping also includes:

- results, through a number of relevant indicators for monitoring activities;
- and a global assessment of the quality mechanisms level for each area, on a 1-5 scale (1-insufficient/5-very advanced).

Figure 5 – SIQuIST meta-evaluation methodology

This mapping, which is a partnership between several support services of Técnico Lisboa that deal with quality issues, will be validated by two Tecnico Lisboa Management structures: the Strategic Plan Monitoring Committee and the Quality Management Council.

4.2 EXAMPLE FOR HIGHER EDUCATION STRATEGIC AREA

This is an example of the methodology applied to one of Técnico Lisboa core processes: the strategic (focus) area of Higher Education.

Sub-processes		**Strategic coordination and guidance** *(identify coordination structures and strategic guidance documents*	**Performance rules and procedures** *(identify documents - manuals, regulations, ... - which set performance rules and procedures)*	**Assessment and control instruments** *(identify result monitoring and assessment mechanisms)*	**Improvement plans** *(identify improvement plans, with any preventive and/or corrective measures)*	**INDICATORS**	
		What to do? Plan according to set objectives	*How to do? Carry out as planned, according to set rules and procedures*	*How to assess? Monitor and assess results*	*How to improve? Promote continuous improvement*	Characterisation (AR)	Quality (impact/ recognition)
STRATEGIC	Improvement of Academic Success	**Structures** - Vice-President for Academic Affairs of the Governing Board - Scientific Board - Pedagogical Council, - SC Coordinators - Mobility coordinators - Academic Office ... **Strategic documents** - Strategic Plan - Quality Plan - Activity Plan - IST By-Laws ...	**Legislation** - Framework Law of Educational System - Legal Regime of Higher Education Assessment - Award of degrees and diplomas - Regulations for Registration Foreign Diplomas ... **IST Documents** - Study plans (OJ) - Academic Guide 1st, 2nd and 3rd cycles - Service procedure manual - Tutor Manual ...	**Internal** - Faculty performance assessment surveys - Course Unit and faculty audits - Annual Self-assessment reports of Study Programmes - Admission characterisation studies of new students - Final-year student surveys regarding their academic path - Technical and administrative service assessment surveys - Activity Report ... **External** - Assessments of the Portuguese Accreditation Higher Education Agency (A3ES) - Assessment of the Order of Engineers under the award of the EUR-ACE seal of quality	- Recommendations and Reports of the Study Programmes - Audit Improvement Plans - Recommendations of the External Assessment Committees - Activity Plan ...	1. No. of programmes 2. No. of students enrolled 3. No. of course units 4. No. of Graduates 5. % of women 6. No. of study programes with RD&I 7. No. of MOOC ...	8. Vacancy staffing rate 9. Student admission average 10. Dropout rate 11. Survival rate 12. Average completion time of the Study Programme 13. Average pass rate in Course Units ...
STRATEGIC	Development of digital contents and e-learning platform						
STRATEGIC	Increase in attractiveness of MSc and PhD degrees						
STRATEGIC	Improvement of flexibility of curricular and mobility of national and international students						
STRATEGIC	Promotion of lifelong learning						
STRATEGIC	Streamlining educational offer						
OPERATIONAL	Creation, review and closure of study cycles						
OPERATIONAL	Creation, review and closure of SC						
OPERATIONAL	Preparation of academic activity						
OPERATIONAL	Selection, admission and registration of students						
OPERATIONAL	Performance of academic activity and award of academic degree						
Self-assessment		**Very advanced**	**Substantial**	**Partial**	**Poor**		

Figure 6 - Mapping of quality mechanisms in Higher Education focus area

The system includes four phases:

- Goal setting;
- Regulation;
- Monitoring;
- Quality enhancement.

The first step (Goal setting) begins by establishing operational and strategic goals for each area within the organisational structures of the faculty (e.g. for Higher Education - increasing academic success and internationalisation, improving digital learning contents, or supporting students with disabilities), and then by developing plans for attaining them.

However, for performing such plans, there is the need to institute guidelines for the faculty activities (Regulation), according to the appropriate existing standards and norms (national juridical framework and Tecnico Lisboa Academic Guide).

The next step (Monitoring) embraces evaluation of the activities' results through suitable monitoring tools developed within the institution (e.g. Tecnico Lisboa Quality Assurance System for Curricular Units, Annual Self-Assessment Report for Tecnico Lisboa programs, staff/employers/graduates/students satisfaction surveys).

Finally, in the fourth and final step (Quality enhancement), the results obtained in the previous step are used to define improvement plans, and for establishing new targets for the faculty.

4.2.1 Activities characterization

First, activities in this big core process were identified in terms of strategic activities and operational activities:

Strategic:
- Academic Success Improvement;
- Development of digital contents and e-learning platform;
- Increasing the attractiveness of Master and PhD degrees;
- Improvement curricula flexibility and mobility of national and international students;
- Promotion of Lifelong Learning;
- Rationalization of the training offer.

Operational:
- Creation, review and extinction of Study Programs;
- Selection, admission and registration of students;
- Preparation of teaching activity;
- Implementation of teaching activity and degree assignment.

4.2.2 Coordination structures and strategic guidance

The first step involves identification of coordination structures and strategic guidance that define the activity goals: what to do? Plan according to the objectives is the first step, so HEIs have to look for the existence of management structures (eg. Councils, Boards, Services) and related guidance documents (eg: strategic plans, activity plans).

4.2.3 Implementing rules and procedures

The second step encompasses implementation of operational guidelines and procedures for the activities: how to perform the planned actions according to the appropriate standards and procedures? In this regard, it is necessary to identify the documents (e.g. manuals, regulations) establishing the rules and procedures for activities implementation.

4.2.4 Monitoring and assessment tools

In a third step, one must ensure that the HEI is doing right what it is supposed to do: how to evaluate? Here comes the need for checking the existence of monitoring and assessment tools to control activities results.

4.2.5 Improvement plans

In the fourth and final step, if the purpose of the mechanism is to improve the activity, the results obtained in the previous step will help define improvement plans: how to improve? By identifying possible preventive and/or corrective measures to develop, and incorporate them in the first step of strategic guidance and planning of the activities.

4.2.6 Performance indicators

Finally, and going through the whole process, there must be a number of indicators not only to fix specific targets in the first planning step, but also to measure and monitor activities results in the second and third step: records to measure results of operational activities and strategic targets; and quality indicators measuring recognition and impact of the activity. Moreover, these indicators should be incorporated in the last step (improving plans, re-definition of goals/targets).

4.2.7 Meta-evaluation results

By analyzing mapped quality mechanisms, it was possible to assess and classify their level of development. Using a similar scale to that used by the national Agency for quality systems certification (insufficient, partial, substantial and very advanced), Tecnico Lisboa was able to identify potential gaps in each of the four stages:

- are existing coordination structures sufficient and do they produce/disclose strategic orientation that allows activities of each strategic area to be satisfactorily planned?
- are regulations and implementation rules for specific activity tasks the most appropriate and do they lead to efficiency and effectiveness of planned activities?
- are the monitoring and evaluation tools of the activities satisfactory, and do they provide indicators for the results assessment and promotion of quality?
- is there an effective feed-back from assessment tools, using assessment results for the development of improvement plans with possible corrective actions?

5. FINAL REMARKS

SIQuIST provides an evaluation of Tecnico Lisboa strategic areas, involving different stakeholders in the process, in a clear and responsible manner.

SIQuIST is not a static model, restricted merely to data collection: it is a dynamic and continuous quality improvement system, with the adjustment of Tecnico Lisboa processes, monitoring of its progress, and providing a cyclical review of the results.

In addition, there were other several benefits and impacts of this quality management system on the faculty, such as:

- reinforced commitment of the institution's governing bodies concerning quality issues;
- involvement of the academic community in a joint reflection on monitoring mechanisms;
- greater transparency of processes and improvement of internal communication concerning Tecnico Lisboa quality strategy.

Although, SIQuIST is well established within the institution there is still room for improvement, transforming SIQuIST in an even more results-oriented mechanism.

It is vital to keep engaging Tecnico Lisboa community in the SIQuIST process, by establishing internal forums, with the aim to discuss quality assurance procedures and results, and as a consequence, ensuring a broadly shared understanding of quality.

For that purpose, it was created an Internal Observatory of Good Practices in all the eleven strategic focus areas, and from the two calls (2016 and 2017), it was possible to organize a sharing meeting for the presentation and debate of the 12 best practices selected.

In conclusion, we find that SIQuIST is vital for the institutional management, transparency and accreditation requirements.

Facing the new challenge of Institutional Assessment, we believe that Portuguese HEIs have to implement and consolidate their quality management systems, and for that, it is essential to promote a meta-evaluation, which helps track the system in terms of strengths and weaknesses.

It is important that efforts of HEIs continue to devise quality systems and make accountability an obligation, but should not overshadow the importance of continuous improvement. The critical sense of those who prepare the self-assessment exercises in institutions should be emphasized, allowing for the introduction of changes for a true quality enhancement process. Institutions should look for quality assessment models and

systems that allow them to internally ensure and improve quality, irrespective of the external mandatory assessment systems.

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