Quality Assurance System to monitor the teaching and learning process at the University of Aveiro (Portugal)

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Abstract

At the University of Aveiro (UA), in Portugal, institutional initiatives are being undertaken so that high levels of quality teaching and learning are achieved. This paper presents (a) the design of an evaluation model for quality assurance of teaching and learning and (b) the results of its application in a pilot study that ran in 2008/09 at the Departments of Electronics and Telecommunications, and Physics, of the UA. The Quality Assurance System (QAS) to monitor the process of teaching and learning at the UA emerges as extremely important, not only to regulate the teaching and learning process, following the quality assurance orientations at a national and international level, but also to reflect and share teaching practices that enhance the whole academic experience, both from students, teachers, and researchers' perspectives. The authors explore the design of the model and some findings of the pilot study, more specifically the identification of problematic and good practice situations identified by the students' survey and reports.

1. Introduction

The University of Aveiro (UA) was founded in 1973 and became a Portuguese Public Foundation in 2009 (Law-Decree 97/2009, April the 27th). Its structure includes fifteen departments, two autonomous sections and four polytechnic schools, dedicated to different academic domains. The educational offer includes post-secondary, graduate and postgraduate programs. The UA is concerned with the labour market demands and focuses on teaching, learning and research. At the UA, nowadays, there are about 14.500 enrolled students, and 1.500 teachers and researchers.

Since 1997 that the UA managing structure includes a Vice-Rector responsible for the internal quality assurance and, in 1999, the Office of Quality, Evaluation and Procedures (GAQAP – "Gabinete de Qualidade, Avaliação e Procedimentos") was created. The mission and specific objectives are to promote and assure quality, continuously evaluating and defining the standards of procedures and their practical implementation in accordance with the European and Portuguese guidelines for quality assurance.

This paper explores the bottom-level quality assurance strategy by presenting the design and implementation of a new internal system to evaluate the quality of teaching and learning at the discipline and course level. This process initiates a complex quality assurance system represented in Figure 1.
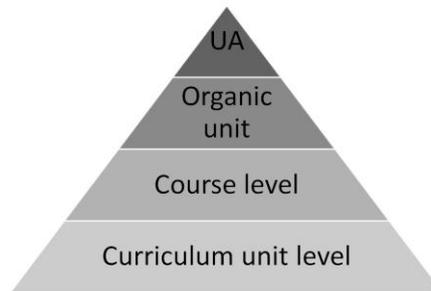
Figure 1: Quality Assurance System at different levels

The quality assurance system of teaching and learning (QAS-TL) was designed in 2008 by a team of four teachers and three technical staff coordinated by the Vice-Rector, and applied for the first time, as a pilot study, in the same year. The data collected are being analysed by the Office of Information Management System (Gabinete de Gestão de Informação – GAGI), under the supervision of the Vice-Rector for Quality Assurance, and interpreted by the Laboratory for the Evaluation of Educational Quality (LAQE – "Laboratório de Avaliação da Qualidade Educativa"), a research laboratory that belongs to the research center CIDTFF, located at the University of Aveiro. This multidisciplinary team aims to bring into the discussion the achieved results at the QAS by providing guidelines and suggestions for future improvements of the model and intervention activities for coping with the identified problems.

2. Quality in Higher Education

Since the signature of the Bologna Declaration in 1999, certain issues, such as the quality of teaching, learning, assessment and research are acquiring a bigger relevance at Higher Education (HE) settings in Europe in general, and in Portugal in particular. Thus, the effort on promoting high quality teaching and learning reveals a transversal concern from the European educational systems aiming to accomplish some common goals, more specifically: (i) to establish an Europe of Knowledge and an European Space of HE, (ii) to transform European societies into learning societies and a competitive learning space; (iii) to achieve economic prosperity and (iv) to enhance social cohesion (Buchberger *et al.*, 2000).

The concept of quality in HE has been broadly explored and it is consensual that this concept is highly complex, difficult to define and multi-dimensional*: (…) quality is a relative term, and an empty term until it is given content* (Clemet, 2003, p.2). When referring to the quality of HE teaching and learning, the efforts in delimitating and characterising it remain difficult. We also may witness some arguments and conceptual divisions regarding the definitions of expertise and excellence of teaching (Kreber, 2002). These circumstances may affect the establishment of a conceptual framework regarding the quality of teaching and learning in HE:

> *It is a multi-faceted and embraces three broad aspects: (i) goals; (ii) the process deployed for achieving goals; and (iii) how far goals are achieved. There is no single definition or way of measuring quality* (Frazer, 1994, p.103).

Nonetheless, there are some consensual dimensions that may be considered to evaluate the quality of teaching and learning, such as: (i) the student-centred focus of the teaching and learning process; (ii) the pedagogical skills and competences that teachers (may) have; (iii) the reflective practice of teachers which may lead them to transform and re-define their actions; (iv) the learning environment that must be created and also (v) the institutional culture, which must support the creation of an appropriate environment for the teachers pedagogical actions and training (Pinsky & Irby, 1997; Pinsky et al., 1998; Henard & Leprince-Ringuet, 2008).

2.1 Quality assurance systems

When addressing the previous arguments, one becomes aware of the fact that it is inevitable to evaluate the quality of teaching and learning and to proceed to well structured and supported quality assurance systems, properly grounded on theory and practice:

> *Evaluation is no stranger to higher education. (…) it is an essential component in the advancement of scientific knowledge (…) is an integral part of the dynamic of higher education and its regulation. It is both summative and decision-oriented and formative and development-oriented.* (Henkel, 1998, pp.291-292)

In a globalized world, in which mass HE has been replacing the former somewhat elitist systems, the need to guarantee the quality of the provided education, and to continuously improve the institutional responses to the learning needs of the changing student population becomes central. Within the European context, the Bologna Process has been setting the scene for major developments regarding quality assurance and accreditation (in a dialectic relationship in which a proper balance is sometimes hard to find). Mobility, the recognition of qualifications and social inclusiveness are major goals of the Bologna Process that challenge quality assurance and accreditation systems, as recognized in most reference documents, especially since the Berlin inter-ministerial meeting, in 2003. The document "Standards and Guidelines for Quality Assurance in the European Higher Education Area" (ENQA, 2009), produced by ENQA[1] in association with EUA, EURASHE and ESIB, in 2005, has become a corner stone of these efforts and has had implications in most signatory countries, as is the case of Portugal, in the recent legislation regarding the new organization of Higher Education Institutions (Law nr. 62/2007, 10th September) and the new framework for the

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[1] ENQA - European Network for Quality Assurance in Higher Education, now called European Association for Quality Assurance in Higher Education.
EUA - European University Association.
EURASHE – European Association of Institutions in Higher Education.
ESIB – National Unions of Students in Europe, now called ESU – European Students Union.

assessment of programs and HE institutions (Law nr. 38/2007, 16th August). In all these documents, regardless of their specific focus, it is assumed that each institution is responsible for developing its own internal quality assurance system, which will then serve as the basis for the external auditing systems, where established, and for the continuous improvement of the internal quality. Since the Bologna Process involves two major paradigm shifts, towards student-centeredness and learning outcomes-organized programs, one major component of those internal systems regards the quality of the teaching and learning process.

Therefore, HE institutions must develop internal mechanisms and suitable instruments to auto and hetero-evaluate the quality of teaching and learning. When reflecting about the results, interventions and changes must be proposed so teaching and learning can be enhanced, solving the identified problems and, above all, improving students' learning experience (Oliver, Tucker, Gupta & Yeo, 2008; Machado dos Santos, 2009).

4 Design of the QAS-TL

The QAS for monitoring the teaching and learning process was designed based on the above assumptions. The experience of other Quality Assurance Systems was taken into account, namely the one from the Instituto Superior Técnico (IST - the School of Engineering of the Technical University of Lisbon, Portugal).

The QAS-TL foresees four phases: (i) Diagnosis; (ii) Improvement; (iii) Quality Assurance and (iv) Supervision. All the actors involved in the teaching and learning process should be heard: students, teachers, course coordinators, and student delegates of each program.

The first phase – Diagnosis – begins with the evaluation of Curricular Units (CUs) and takes place in a period of 3 weeks. In order to develop a more complete diagnosis, the results take into account information gathered in three moments. Firstly, all students answer an online survey at the end of each semester.

Secondly, student delegates and program coordinators meet with the objective of discussing the problematic situations, and identify good practice examples, in each program. Thereafter, if the group identifies "problematic situations", they must write a report that obeys a pre-defined structured.

Finally, other statistical information available through the students' individual and institutional platform (PACO) is also taken into consideration (mainly performance indicators).

In the second phase – Improvement – all teachers involved in each CU are asked to elaborate an online report, in which the teaching and learning foundation strategy for their practice is described. If they wish to do so, teachers can also write self-evaluation report of their teaching practice. The whole "Improvement " phase takes place in 4 weeks.

The coordinating teachers of the different CUs are then asked to elaborate a summary report, based on the diagnosis phase and on the teachers' individual reports, aiming to produce a global analysis of the situation. In the cases identified as "problematic

situations", an improvement plan designed by the coordinating teacher of the CU is requested. This plan needs to include corrective actions and to identify the necessary resources to put the Plan in practice. Finally, this Plan has to be analyzed by the Program Commission that writes another report, in which adjustments to the final version of the "Improvement Plan" may be suggested.

The third phase – Quality Assurance – involves the analysis of all CUs reports in a given Department by a nominated Analysis Commission, which includes teachers and students. The Commission must produce a global report that should contain an executive summary, characterising each CU of the Department based on the analysis of the reports produced by the coordinating teachers of the CUs. This phase runs in three weeks.

The same document should also consolidate the "Improvement Plans" related to the "problematic situations", the cases of teaching good practices, and the resources and adjustments needed to implement the "Improvement Plan". This report is then submitted to the Department Council for approval.

Finally, the fourth phase – Supervision –is carried out by the Pedagogical Commission, whose members should act as mediators in the process. Also, this Commission should analyse and disseminate the results. This process is transversal to the other three phases.

5 Implementation of the pilot study

This paper focuses on the data analysis of the pilot study that ran in the second semester of the academic year 2008-09 at the Department of Physics (DP), and the Department of Electronics, Telecommunication and Informatics (DETI). The methodological decision to choose these two departments deals with two reasons: the existence of an internal assessment plan already developed by the Physics Department, and the large dimension of the Electronics, Communication and Informatics Department when compared to the other UA departments.

Due to the complexity of the data we focus our attention only on phase one of the model implementation (diagnosis), more specifically on the identification of problematic and good practice situations, as signalled by the students. As it was mentioned earlier, the data were collected through a survey and a report. Table 1 summarises the data collected in the pilot study.

Dept.	Curricular Units	PS Survey	PS Reports	PS Total	Good pratice situations	Aditional Improvement plans
DETI	29	4	8	11	0	4
Phys	32	4	4	7	1	3
Total	**61**	**8**	**12**	**18**	**1**	**7**

DETI: Department of Electronics, Communication and Informatics
Phys: Department of Physics
PS: Problematic situations

Table 1: Description of the data collected in the pilot study

5.1 Student Survey

The Teaching and Learning Appreciation Process ('Apreciação do Processo de Ensino-aprendizagem') survey is organized in two parts. In the first part, the student is asked to indicate for which curricular units he/she feels capable of answering the questionnaire, based on his/her degree of involvement in the curricular units. For each of those units, the students are also questioned about their perceived workload.

In the second part of the survey, the students are asked a set of questions (28 overall) dedicated to probing specific aspects of the teaching and learning process, namely:

- A. Self-assessment for each CU, regarding motivation and engagement (including attendance rate);
- B. Curricular Unit Characterization, involving a global appreciation of the CU, the adequacy of the assessment methods, the perceived development of competences and the level of difficulty of the proposed activities;
- C. Teacher(s) Characterization, regarding the teacher(s)'s capacity to motivate/support the students, the teacher(s) pedagogical skills and their capacity to establish a good student/teacher relationship.

The survey is available electronically, via the institutional system PACO. The information is statistically processed, and a set of filters is then applied to automatically identify the curricular units for which special attention should be paid, either for problematic or good practice situations.

Table 2 summarizes the conditions used for the identification of those curricular units.

Problematic situations	Good Practice
Condition 1: If the average classification in the Groups "Curricular Unit(s) Characterization" (7-17) or "Teacher(s) Characterization" (18-29) is $\leq$ 3,5 (1-9 scale).	**Condition 6:** If the average classification in the Groups "Curricular Unit(s) Characterization" (7-17) or "Teacher(s) Characterization" (18-29) is $\geq$ 8 (1-9 scale).
Condition 2: Whenever there are at least 3 questions in the Groups "Curricular Unit(s) Characterization" (7-17) or "Teacher(s) Characterization" (18-29) with an average classification $\leq$ 2,5 (1-9 scale).	
Condition 3: Whenever there are at least 2 questions in the Groups "Curricular Unit(s) Characterization" (7-17) or "Teacher(s) Characterization" (18-29) with an average classification $\leq$ 2 (1-9 scale).	
Condition 4: Curricular Units for which the passing rate lies below the lower percentile (10%) for the corresponding department, calculated as the quotient of the number of passing students over the	

number of students undertaking the prescribed assessments.	
Condition 5: Curricular Units for which the passing rate lies above the upper percentile (10%) for the corresponding department, calculated as the quotient of the number of passing students over the number of students undertaking the prescribed assessments, and for which the workload, as indicated by the students in the questionnaire, lies below 50% of the estimated ECTS.	

Table 2: Conditions for the automatic identification of out of the average situations

Within the scope of the pilot study described in this article, the automatic analysis produced few results for conditions 1, 2, 3, 5, and 6: just one result each, in each of the departments. On the other hand, Condition 4 was responsible for the largest number of results: two cases in one department and four in the other. Given these results, and since the survey answering scale is large (1-9), the reformulation of some of the conditions is now under consideration, more specifically regarding Conditions 1, 2 and 3. For example, changing the average classification for 4,5 in Condition 1 would substantially increase the number of CUs identified as problematic situations. The goal of this reformulation is to try to detect problematic situations at an earlier stage, taking advantage of the fact that the system was not overloaded by the established conditions.

5.2 Student reports

The report was available electronically with a pre-defined structured focusing on: (i) strong and weak aspects, (ii) cases of good practice and (iii) suggestions to improve the process of teaching and learning. Twelve CUs from the two departments (4 from DP and 8 from DETI) were identified as problematic situations (Table 1). In spite of not being considered problematic situations, students filled in the reports for 20 other CUs, making comments and suggestions.

Through the content analysis of these reports, we identified, as problematic situations and suggestions for improvement, two dimensions: (i) pedagogic and didactic methods, and (ii) resources. The cases identified in just two CUs were not taken into consideration, since they represent isolated situations that are not representative of the sample. In the next subsections, we will briefly present the dimensions under study.

5.2.1 Pedagogic and didactic methods

This dimension is related to the teachers' pedagogic and didactic competences. Four categories emerged: (i) teachers' coordination; (ii) teachers' pedagogic skills, (iii) assessment criteria; and (iv) type of assessment.

The category 'teachers' coordination' refers to the articulation between teachers that teach different types of classes in the same curricular unit (e.g. tutorials and labs). According to students, the coordination between teachers is not always successful in what regards (i) the design of the assessment criteria or even the assessment activities (number of cases: 6), and (ii) the tutorial classes (number of cases: 2). For example,

teachers can use different assessment criteria for the same task which may create disparities of assessment results between different classes.

The category 'teachers' pedagogic skills' refers to the ability of teachers to interact with students in the face-to-face environments, to run student-centered teaching approaches, and to design effective assessment strategies (linking assessment to the learning outcomes). Students refer to some problems in this category (number of cases: 9). The emphasis on constructive alignment (Biggs, 2002) (or, in this case, misalignment) should be noticed.

The category 'assessment criteria' refers to the criteria applied by teachers to assess the activities and the way in which the final grade is calculated (namely, the weight of continuous assessment activities and final exams). Students point out two aspects: (i) there are different assessment criteria used by different teachers of the same CU, lack of clarity and objectivity in the defined criteria, and in some cases absence of assessment criteria at all (number of cases: 5); (ii) activities undertaken for continuous assessment have a lower weight when compared to the weight of the final exam (number of cases: 6).

As strong points, and good practice examples, two categories emerged: (i) teachers' pedagogic skills; and (ii) type of assessment. Students refer they were satisfied with the pedagogic skills of teachers (number of cases: 16) and found continuous assessment valuable for assessing learning (number of cases 7). The feedback regarding the assessment reveals that in spite of the hard work throughout the semester, the continuous assessment bring positive advantages:

> *"the assessment divided in various moments and types throughout the semester allows the teacher to follow up the students' progress and to give feedback of the performed activities".*

5.2.2 Resources

This dimension is related to the quality and accessibility of the department/institution resources. One category emerged: 'departmental and institutional resources'. 7 cases were identified, such as the no permission of students to use simulation software outside the labs or equipment malfunction at the labs.

6. Final considerations

The above model represents the way in which the UA is answering to the demand for the development of internal quality assurance systems in what respects the involvement of the students and staff in the improvement of the teaching and learning processes.

The proposed system, besides integrating all the relevant dimensions for the evaluation of the teaching and learning processes, also has the advantage of avoiding an excessive workload for the involved agents, since most preliminary indicators are automatically generated and processed (e.g. questionnaire administration and results, performance indicators, and so forth). The qualitative information collected through the different reports will then enrich the understanding of the evaluation process.

Both students and staff are only involved in the interpretation of the results and in the subsequent decision making process. Nevertheless, the direct involvement of these agents and also of the various coordination structures (pedagogical commission, program commission and the management structures of the departments) assumes the important role of sharing the responsibility for what is being done in the field and for the implementation of the necessary measures to improve the quality of teaching and learning. We believe this holistic perspective is essential for validating the model

The results of the pilot study are quite encouraging, when considering the evaluation of the outcomes of the model. Although this article has only focused on the first phase of the process, its potential is already evident in what regards the data on which the next phases will build on.

The authors believe that the experiment described in this article may serve as an inspiration for other HE institutions that will, eventually, have to "walk the same path". We finish this paper by presenting two questions for discussion at the forum: how can the institution motivate students and members of staff to compromise themselves to this evaluation process? How can we demystify the 'negative' view that most evaluation processes are connected with?

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