## 1. Descriptive Items

1. Higher education institution / Responsible entity:

Instituto Politécnico De Viseu

- 1.1.a. Higher education institution / Responsible entity description Instituto Politécnico De Viseu
- 1.2. Unit (faculty, school, institute, etc.): Instituto Politécnico De Viseu
- 1.2.a. Unit description (faculty, school, institution, etc.): Instituto Politécnico De Viseu

### 1.3. Brief comment on the auditing proceedings:

The visit of the External Assessment Commission to IPV – Polytechnic Institute of Viseu took place from 7th to 9th November 2018. Jacinto Vidigal da Silva (President of CAE), Ana Sofia Rodrigues, Gemma Rauret, Samuel Vilela and Maria de Lourdes Machado-Taylor participated in the visit.

Meetings were planned with a composition previously agreed with IPV, in order to fulfil the Basic Programme of the Agency for Assessment and Accreditation of Higher Education (A3ES), which includes meetings with: 1 – Highest academic authority; 2 – Team responsible for self-assessment; 3 – Strategic coordination structure; 4 – A teaching and learning unit; 5 – Students of the 1st and 2nd cycles; 6 – A research unit; 7 – Support services; 8 – Teaching staff; 9 - Coordination/structures of inter-institutional and community cooperation; 10 – Highest academic authority; 11 – Academic authorities and invited individuals.

All meetings took place at the IPV facility, in Viseu.

In all the meetings, the CAE underlined the voluntary nature of the audit exercise and clarified the objective of the analysis, stressing this was not the assessment of IPV's performance, but rather its internal system of quality assurance (SIGQ).

A significant sample of internal agents was heard, from the SIGQ perspective, as well as some representatives from external stakeholders.

The institution collaborated actively in both preparing and holding the meetings planned.

The complementary information requested by the CAE was supplied before the visit in a dropbox accessible to all members.

During the meetings it was possible to confirm that the participants were familiar with SIGQ and knew about the audit and the Self-Assessment (RAA).

# 2. Assessment of the degree of development of the internal quality assurance system

### Note

### 2.1. Definition and documentation of the institutional policy for quality

2.1.1 Definition and documentation of the institutional policy for quality (objectives, functions, actors and levels of responsibility within the internal quality assurance system)

Appraisal of the degree of development of this item of the internal QA system:

Partial

### 2.1.2 Grounds for the judgement issued by the Auditing Team:

The Polytechnic Institute of Viseu (IPV) began the process of implementing its formal system of quality assurance in 2006, according to ISO standards; and was certified as complying with this standard in 2007. The

commitment to the other references was incorporated later. The statutes of the IPV, published in the Journal of the Republic in 2009, state that the President has the authority to "take necessary measures to guarantee the quality of teaching and research in the institution and its organizational units". It also states that the coordination structure of the SIGQ integrates the Quality and Assessment Council (CAQ) and the Quality and Assessment Commission (ComAQ) into the Organic Units of Teaching and Research. The Quality Office is responsible for the implementation of quality policy and the production of information to accompany the system.

This is a SIGQ that has a clear and well-defined support structure and involves the leaders of the institution at the highest level (President of the IPV and Presidents of the Organic Units. The CAE recommends reflection on the very limited presence of Students in the CAQ, which only includes the representative of the Students' Union. The integration of some external individuals with experience in the area of quality also deserves reflection. In the Quality Manual (MQ), the IPV established the excellence of its activities as the goal of the quality policy, aiming for sustainable development, the valorization of resources and the satisfaction of all parties involved. According to the RAA, the SIGQ works in accordance with European Standards and Guidelines (ESG), regulations (ISSO) and recommendations from A3ES and uses its MQ as a reference document. However, this document has a very administrative vocation and corresponds mostly to a Manual of Procedures. The approach followed is oriented to be a planning document meant to be used by those who are responsible for the SIGQ. Moreover, it places insufficient emphasis on mechanisms to promote stakeholders' participation, as well as on the analysis of actions to be undertaken under the continuous improvement cycle.

The CAE recommends the design of a new version of the Quality Manual (MQ), which should follow more closely the references of the A3ES. That process should be based on a very extended discussion within the IPV in order to mobilize most of its main actors and motivate them to participate in the construction of a true quality culture. Also, because it contains an extensive documentation and description of procedures, it makes the manual less user-friendly for the academic community and does little to mobilize the quality culture. The CAE has not been able to obtain evidence of intermediate synthesis reports, such as the analysis of students' perceptions of teaching quality, analysis of research and extension, or services with a view to highlighting the contribution of UOs and of the IPV itself.

There is also insufficient articulation between the Strategic Plan (PE) and the annual Activity Plans (PA) and Activity Reports (RA) of the institution and these with those of the UOs. The annual course reports (RAC) and the reports of the curricular units (RUC) have different formats, which makes it difficult to articulate them and to elaborate the intermediate synthesis reports.

In summary, the quality policy is defined, there is a structure of responsibility in management of the SIGQ that involves the leaders at the highest level. However, the supporting documentation needs to be improved and included in the revision of the Quality Manual and some intermediate synthesis reports must be elaborated, mainly the analysis of students' perceptions regarding the quality of teaching.

### 2.2. Scope and effectiveness of the procedures and structures for quality assurance

### 2.2.1.1 No ensino e aprendizagem

### Appraisal of the degree of development of this item of the internal QA system:

Substantial

### 2.2.1.2 Grounds for the judgement issued by the Auditing Team:

The RAA mentions that the educational supply is established according to the institutional strategy, considering the contribution to employability, the preparation for active citizenship, the support given to the students' personal development and it should encourage research and innovation.

The system contains two processes directly associated with teaching and learning (E / A): the "management of educational supply" and the "management of training activities". The creation of new study cycles follows the procedure defined in the system, but the contribution of external parties is not clearly identified. However, several examples of the participation of external entities in these processes were presented during the meetings.

The regular self-assessment of study cycles is also defined as a "management of training activities" procedure, where it is intended to listen to the various actors involved in the E/A process, including monitoring of UC programs, preparation of UC reports (RUC) and annual course reports (RACs).

Regarding the indicators and targets associated with the consultation of the parties involved in the E/A, such as the questionnaires applied to students, teachers, graduates and employers, there is excessive focus on monitoring response rates, with less emphasis being placed on satisfaction indexes, as well as on the measures to be taken to improve areas where satisfaction may be lower than the value or criteria defined. The CAE recommends a review of the objectives presented in the Map of Objectives and their alignment with the objectives established in the Strategic Plan 2017-2021. This alignment can be achieved through indicators that reflect the student attraction policy (Objective 1 of the Strategic Plan - "Increase the number of national and international students"), including indicators of the demand for study cycles that consider success and dropout rates.

The IPV reports in the RAA that SIGQ monitoring at E/A level is performed at regular intervals, by levels of

responsibility and that Teachers elaborate the UC reports and the DC/DD elaborate the course reports. However, the CAE found that in 2017, only 38% of the course reports were drawn up on time and there were also gaps in the preparation of UC reports. During the meetings, the CAE confirmed that teachers were unaware of this monitoring process and that these results are associated with problems in the parameterization of the information system. This considers in the calculation of that percentage the various editions of the cycles and UC that are no longer in operation. The CAE was also informed of the possibility of counting as out of schedule the submission of final reports resulting from the review during the continuous improvement process. The CAE considers it unacceptable to have omissions from the internal party with greatest responsibility for the operation of SIGQ and recommends urgent correction of the way of calculating the deadline.

Responding to the students' questionnaire is optional and, as reported in the Quality Score from February 2018, has a low average response rate. It was mentioned at the meeting that the formula for calculating these indicators should also be revised. The institution itself indicates in the RAA, as a weak point, the low rate of response of students, graduates and employers to the different satisfaction questionnaires applied at the institution and states that the review of several questionnaires was initiated. The CAE reinforces the importance of the involvement of all stakeholders in this ongoing process.

The UC reports and the Course Reports that have so far been carried out in the various UOs present different structures. A common model has been defined in 2018, which is still in the implementation phase. Most of the UC Reports provided during the visit did not have information regarding the results of the satisfaction questionnaires applied to the various stakeholders. The only information reported was the % of participation. This analysis, as well as other aspects of formative efficiency, such as dropout data and academic success/failure, among others, is still missing in the new models of the UC reports and Course reports. In the RAA, the institution states the report of activities where the formative effectiveness is analyzed is published yearly. However, in the RA from IPV (http://www.ipv.pt/secretaria/ispv/ra2017.pdf) there is no analysis of the effectiveness of the educational offer nor results of academic success and employability. The institution also points out in the RAA that the mechanism for collecting data on job placement (including the monitoring of the trajectory of graduates in terms of employability) has not been applied in a systematic way.

It was possible to confirm the concern with the reception and follow-up of students and the offer of opportunities for students to have contact with research activities. Although there is no structured programme to host new students and/or a mentoring program, there is clear evidence of related initiatives that can evolve into organized and integrated processes in the SIGQ.

An automatic plagiarism detection mechanism was also confirmed.

It is concluded that most of the teaching/learning quality assurance procedures exist to identify instances of poor quality, and their effectiveness can be improved by harmonizing the documents and procedures between the UOs and by correcting the indicator of automatic counting of the preparation time of teachers' reports when handed in late.

# 2.2.2.1 In research and development / Targeted research and high level professional development Appraisal of the degree of development of this item of the internal QA system:

Substantial

### 2.2.2.2 Grounds for the judgement issued by the Auditing Team:

The Strategic Plan (PE) of the IPV aims to increase the revenue from research projects and presents a list of actions to stimulate research activities, development and innovation (ID&I), as well as a set of measures for cooperation in research, innovation and internationalization. These measures reveal a concern about self-knowledge to support the definition of priority areas and excellence and the desire to connect to the region and to education. The measure concerning the collection and systematization of information on projects in the period 2015-2017 has been identified as being of particular interest for quality.

The RAA only presents one research center (CI) designated as the Center for Studies in Education, Technology and Health (CI & DETS). However, on the web page of the Institute, four other CIs are presented: the Center for Research in Education and Pedagogical Innovation (CI & DEI), the Center for Studies in Digital Services (CISeD), the Health Sciences Research Unit: Nursing (UICISA: E) and the Center for the Study of Natural Resources, Environment and Society (CERNAS). CI & DETS and CISeD have their place in the IPV, but the rest are CI in partnership with other institutions.

Cls are well presented on their own web pages, accessible through the IPV portal, which contains information on research teams, research areas, publications and events. However, there is no access to regulations and activity reports and none of the CI has external scientific advisory committees, which is something that the CAE considers to be fundamental for improving the quality of research.

The CAE found in the CI & DETS regulation that this research center is open to all teachers and assistants of UOs who wish to participate; and that their activity is monitored in the activity reports. The CAE considers that although this practice has the capacity to detect instances of insufficient quality, it should be complemented with criteria of productivity and quality requirement to maintain the status of member.

The research projects are generated in the CIs and their financial execution is monitored in the central services of the IPV. Therefore, there is no coordinating structure with competence in science management capable of offering support in the preparation and management of projects and that can systematize the information in

order to promote the improvement of applications for competitive funding. This structure seems to be crucial in helping to achieve the PE's objective of increasing revenue from research projects.

The statutes and the MQ indicate an organic unit for coordination of UIs and for strategic coordination of research, called the Institute for Development and Research. However, during the meetings the CAE was not able to confirm its existence or any interest in its implementation.

The CAE considers it necessary to review the I&D indicators in order to guide them to the results of research, translated into publications in international scientific journals of high prestige, and intermediate activities, such as the publication of articles in conference proceedings, shall be less valued.

The development of the SIGQ in this area should follow the orientation presented in the PE, regarding selfknowledge, the promotion of benchmarking exercises with other centers, the organization of a specialized structure to support researchers that can gather the good practices necessary to improve the quality of research and to be able to support researchers in presenting better quality projects.

#### 2.2.3.1 In the interaction with society

#### Appraisal of the degree of development of this item of the internal QA system:

Substantial

#### 2.2.3.2 Grounds for the judgement issued by the Auditing Team:

The Strategic Plan, as well as the PA and the RA, do not give enough depth and relevance to this institutional dimension carried out by the IPV. However, the RAA sees interinstitutional and community collaboration as a key element of the strategy and highlights its contribution to the promotion of regional development.

The link with the community is established directly by the IPV or through the Association for Development and Research of Viseu (ADIV). The RAA is not enlightening about the coordination structure of extension activities and, in this context, how the action of UOs is articulated with this structure. The CAE realized that the Schools maintain a culture of autonomy and that a significant part of the activities of collaboration with the community are developed and managed at the level of UO.

ADIV was founded by the IPV and IPV Schools as an interface unit with external entities, both public and private. According to the information available, ADIV provides services in the area of training, consultancy, studies and projects to collective or individual entities. However, during the visit, it was explained that ADIV is not covered by the SIGQ and that IPV only evaluates its participation in that association. The CAE found no mention of ADIV in operating regulations, not even in the MQ.

The RAA presents a list of several actors and agents with which the IPV maintains activities of an institutional, corporate, associative or private nature. These activities include curricular internships and / or project development. However, the RAA does not specify the participation of external stakeholders in quality assurance processes, referring to the procedures described in the MQ, where the set of procedures to be applied in the management of the activities is established.

In the aspects identified for improvement, the IPV states that it is necessary to prepare a report on the interinstitutional collaboration actions, which should verify the maintenance of the assumptions contained in the protocols signed with third parties.

The CAE has verified that the IPV has mechanisms to promote, monitor, evaluate and improve activities developed with and from abroad. Reports are prepared based on previously agreed parameters, and the results are reported to the subjects of the agreement or protocol.

Regarding to the agreements and protocols in force, the CAE noted the satisfaction of external stakeholders and noted that they acknowledge the relevance of the IPV in the development of the region. Nonetheless, the RAA mentions that interinstitutional collaboration and the contribution to regional development need to be better disseminated through the various means of communication available to the institution.

Interinstitutional collaboration on collaborations and partnerships with other higher education institutions is not mentioned in this section. However, in the section that addresses Internationalization, the RAA states that the IPV belongs to a consortium of 8 national polytechnics. During the visit, the CAE also became aware that actions are being taken to conclude agreements for dual degree courses with foreign institutions. At the national level, the IPV participates in the Vasco da Gama mobility program.

The CAE agrees with the IPV, regarding the need to create mechanisms for internal recognition of teachers' performance in the area of community liaison.

#### 2.2.4.1 In the policies for staff management

Appraisal of the degree of development of this item of the internal QA system: Substantial

#### 2.2.4.2 Grounds for the judgement issued by the Auditing Team:

The IPV states in the RAA that it has rules and procedures for the collection and processing of information regarding staff competences and performance in order to evaluate performance, training, promotion and recognition of merit. The training of non-teaching personnel of the IPV is based on the collection of elements for

the preparation of the training plan. This practice is shown in the management documents, where needs are identified in the evaluation of staff performance. However, the RAA indicates as two of the main weaknesses "the limited provision of training for non-teaching staff does not allow the level of training and specialization required for the technical teams involved in the processes" and "the lack of recognition and motivation mechanisms of the merit of teaching and non-teaching staff ". The IPV also identifies the need to review the functions manual, as well as the procedures for evaluating performance.

The questionnaire applied to the co-workers of the SC and SAS (2017) shows that the majority of them believe that "improving quality in IPV requires employees to acquire new knowledge" and "update on new working methods" and that "more training is needed in order to promote the effectiveness of their collaboration in quality improvement." However, there is no evidence of this questionnaire being implemented for the remaining employees of UOs.

Meritorious initiatives for activities aimed at training and pedagogical updating were presented, including congresses on the subject carried out at the IPV. However, it is necessary to consolidate the diagnosis and the systematized planning of these activities. During the meetings the CAE did not obtain evidence of instruments of recognition of pedagogical merit.

The SIGQ should consider, regarding personnel management, the risk associated with the aging of personnel referred to in several reports (RA IPV and SAS Social Balance Sheet). The ESSV has a very high rate of aging in full-time teachers and that rate is growing (evolution analysis 15/16 to 17/18:

http://www.ipv.pt/avq/pessoaldocente.pdf). In this connection, the CAE did not find evidence of action plans to be implemented, based on the risk associated with this data. The public information about the average age of teaching staff should be reviewed because there is inconsistent information regarding 2015/16.

### 2.2.5.1 In the Support Services

Appraisal of the degree of development of this item of the internal QA system: *Partial* 

### 2.2.5.2 Grounds for the judgement issued by the Auditing Team:

Alignment of the current strategic plan with the defined objectives for support services is not evident and there is no evidence of the identification of indicators and targets for all support services.

The RAA states that questionnaires are applied to measure satisfaction with services but in the maps of objectives of the SIGQ-IPV, there are no indicators regarding levels of satisfaction with most of these services. Self-assessment mechanisms are still insufficient in some support services including listening to users and implementation and monitoring of action plans. As an example, in the SAS-2018 activity plans there is no information about listening to users, the management of complaints, nor was it possible to obtain a BQ-SAS or SAS activity report. In the sub-portal of the SAS the latest results available from satisfaction questionnaires regarding accommodation and food are from 2012 although it was confirmed at the meeting that further inquiries were made in 2016.

The Academic Services applies questionnaires but the % of answers in some OUs is null (ESAV) or very reduced (ESEV and ESSV). The documentation services present participation rates for the most relevant surveys (between 18 and 44%). Active Life Insertion Services or facilities / security / accessibility (which are Technical Dept.) are examples of other services lacking evidence of satisfaction evaluation. The institution assumes as a weakness the reduced application of instruments to measure satisfaction and presents, as aspects identified to improve SIGQ, the need to guarantee the application of user satisfaction questionnaires and to ensure the effective implementation of that procedure in all services.

In the BQ-2017, for curative and preventive maintenance (which may have an impact on safety aspects, accessibility and effective use of infrastructures and equipment associated with teaching and research and support services) there is no evidence of achievement.

In some services, such as the Technical Department and Financial Services, continuous improvement can be called into question due to the lack of action in the case of non-conformities detected in self-assessment processes (internal audits). There are many cases of corrections, improvement actions, and preventive actions that are not implemented or which are ineffective.

In 2018, the existing ComQs were regulated and reorganized, including those of the SAS SAC, SD, SF, SRH, and new comQs were created to deal with infrastructures (Technical Services). In the RAA, the institution states that as soon as all the ComQset up in the meantime are in full operation, they will make a decisive contribution to implementation of the SIGQ. This reorganization is expected to eliminate or mitigate some of the weaknesses mention above.

The SIGQ shall ensure the identification and compliance with legal requirements applicable to the institution. However, there are institutional documents such as the Risk Management Plan and Related Infringements that do not reflect the updates of the applicable legislation, which detracts from proper risk assessment, as well as the procedures for preventing legal non-compliance.

For reasons of efficiency in the use of resources, there are centralized services, such as human resources and Technical Services. This model of shared services contrasts with the model of the remaining services that are in the UO. This situation, which is much more demanding from the point of view of the harmonization and the implementation of the SIGQ, also presents a greater difficulty in adopting a quality culture. The result is shown by the observed differences between services, where services that report on activities coexist with others that do not, some that have satisfactory user response rates, others do not, and others do not even have answers; and some correct non-conformities and others do not.

In summary, the CAE considers that the IPV needs to carry out an in-depth reflection on the management model to be adopted in the support services in order to find the best solution to ensure application of the SIGQ to all services effectively and that the IPV needs to implement procedures to ensure continuous improvement in the quality of services.

#### 2.2.6.1 In internationalisation

Appraisal of the degree of development of this item of the internal QA system: Substantial

#### 2.2.6.2 Grounds for the judgement issued by the Auditing Team:

The IPV has established as fundamental objectives of its internationalization policy for 2014-2020 the reinforcement of cooperation, exchange programs and mobility of its students, teachers and employees. These objectives are consistent with those defined in the institution's Strategic Plan.

The IPV has participated in international fairs, within the CCISP or on its own initiative to focus on the recruitment of international students. The target public is Portuguese-speaking countries, mainly Brazil. Nevertheless, according to the RAA, international semesters were taught in English in some of the UOs of the IPV in order to attract more foreign students.

Still regarding internationalization of the educational supply, the Strategic Plan emphasizes the creation of degree-conferring courses with double degrees in partnership with other foreign institutions in Brazil and other CPLP member countries. However, the CAE did not find information, or evidence, of courses operating in these terms. During the visit the CAE concluded that the process is still ongoing.

The CAE believes it is necessary to develop complementary indicators, which show, in a more comprehensive way, the results of the actions undertaken, as well as the deepening of the reporting instruments in order to make more evident the activity developed, the results obtained and the adoption of improvement actions. In order to allow access to greater funding and thus enable more students, teachers and staff to be mobilized under the Erasmus + program, the IPV has been part of a consortium of 8 national polytechnics since 2011. During the visit, the CAE was informed that the students involved in mobility programs are subject to interviews on arrival and that the IPV elaborates its own reports on the mobility experiences with a view to monitoring protocols with similar institutions.

The IPV considers there is some resistance to responding to the questionnaires applied due to the multiplicity of requests from the various entities involved in the management and promotion of mobility. For this reason, in order to increase the response rate, that questionnaire model is currently under review.

Mobility information available to both internal and potential national and international applicants is based on links to websites outside of the IPV or related to mobility programs or host institutions with which protocols are maintained and mobility agreements. According to the analysis of the publication of information for internal and external stakeholders, the CAE believes that improvements need to be made.

During the visit, the operation of a peer mentoring program promoted by the IPV was described, through which students collaborate in the reception of foreign students in order to facilitate their integration in the institution and provide support throughout the period of mobility. However, implementation differs among UOs and, even though it is a worthy initiative, the EAC has not collected evidence that it is properly integrated into the SIGQ.

# 2.3 The relationship between the quality assurance system and the governance and management bodies of the institution

# 2.3.1 The relationship between the quality assurance system and the governance and management bodies of the institution

Appraisal of the degree of development of this item of the internal QA system: Substantial

### 2.3.2 Grounds for the judgement issued by the Auditing Team:

The RAA presents as evidence of the articulation of management and governance bodies with the SIGQ the competences addressed by the Statutes to those responsible for management at the highest level in the system. The presence of the Presidents of the ComAQ of the UOs in the CAQ guarantees a good articulation and comprehensiveness of the system.

The system of planning and financial reporting that involves the coordination structures of the SIGQ and the institutional management bodies and the organic units (UO) is also evidence of that articulation. The Strategic Plan (PE) presented by the President of the IPV and approved by the General Council (CG) is prepared at the highest institutional level and is a reference for the entire planning system. The Annual Activity Plan and the Annual Budget, as well as the Annual Activity Report of the IPV are then prepared. In order to facilitate the necessary vertical and horizontal articulation of the system, the objectives, activities and indicators maps are elaborated by the Quality Office.

However, the CAE noted in the documentation and confirmed at the meetings, that there is no adequate alignment of the plans at the various levels. This situation was justified by the temporal difference between the electoral acts for the institutional bodies and the UOs bodies and by the absence of a PE with a longer time horizon. The CAE considers that this lack of articulation of the plans could affect the efficiency of the system. Therefore, it is necessary to reflect deeply on the method of preparing the plans.

The CAE also considers that the PA are excessively oriented towards monitoring actions or measures and that they ignore the effects of their implementation, necessarily being evaluated based on results measured by institutional performance indicators.

Although the monitoring of actions is undoubtedly of interest to management and should therefore be maintained, the plans need to include targets for performance indicators in the mission areas, which are also the main subject of activity reports.

At the level of the report the CAE noted that there is already a concern with the description of the institutional performance. The report of activities of the IPV presents a diverse set of results indicators regarding the educational supply, research, internationalization, connection to the community, among others. In order to ensure a valuation of the improvement of the institution's performance, the results of the indicators must be integrated into the text in at least two or three previous years in order to provide a perspective of institutional progress and to facilitate a critical reading of the results achieved, as well as the effectiveness of the measures taken.

It is therefore unequivocal that the SIGQ is intertwined with the activities and strategic management of the IPV, that these activities involve leaders at the highest level and that they have information on activity monitoring in order to take decisions to improve the institution's performance.

### 2.4 The participation of internal and external stakeholders in the quality assurance processes

### 2.4.1 The participation of internal and external stakeholders in the quality assurance processes

Appraisal of the degree of development of this item of the internal QA system:

Substantial

#### 2.4.2 Grounds for the judgement issued by the Auditing Team:

The chapter of the MQ about the documentary structure presents the top-down approach followed in implementation of the IPV strategy and the bottom-up approach followed in the production of information. This model of organization by itself ensures the effective participation of all internal stakeholders - teachers, researchers, students, non-teaching staff and external stakeholders. The MQ also presents an excellent representation of the organic structure, identifying the participation of the interested parties in the various bodies of the institution.

The RAA presents a summary of the participation of all stakeholders, which corresponds to the competencies attributed to the different actors according to the IPV Statutes. Teachers participate in most of the SIGQ processes. In particular, their intervention in the processes and decisions at various levels, ranging from the General Council (CG), the Academic Council (CA), the Quality and Assessment Council (CAQ), the Quality and Assessment Council (CAQ), the Quality and Assessment Commission (ComAQ), the management bodies of the UOs such as the Assembly of Representatives (AR), the Pedagogical Council (CP) and the Technical-Scientific Council (CTC) and in the Departments.They also participate individually in the SIGQ by responding to self-assessment questionnaires of the UC, self-assessment in the performance assessment system, through the satisfaction questionnaires on services and surveys and also in the internal audits.

Under the terms of the Statutes, students also participate at practically all levels of the SIGQ, except in the scientific bodies. They participate in the decisions and processes of the General Council (CG), Academic Council (CA), Quality and Assessment Council (CAQ), Quality and Assessment Commission (ComAQ), in the management bodies of UOs such as the Assembly of Representatives and the Pedagogical Council (CP) and in course committees. They also participate in the SIGQ through the response to pedagogical questionnaires (students of the first and second cycles) and the satisfaction questionnaires on services.

Non-teaching staff participate in the Management Council (CG), Quality and Assessment Council (CAQ), Assembly of Representatives (RA) of the UOs, in the preparation of the reports of the services, in the plans and report activities and in the internal audits.

Former students participate by answering satisfaction questionnaires concerning the courses they completed. External stakeholders participate in the General Council and by responding to satisfaction questionnaires on the performance of graduates.

In order to achieve more rapid development of the quality culture, the CAE considers it essential to increase the participation of students and external stakeholders in the coordination structures and processes of the SIGQ. In particular, reinforcement of the students' presence in the Quality and Assessment Council and in the Quality and Assessment Commissions, as well as consulting stakeholders in the creation, revision or extinction of

# 2.5 The information system (mechanisms for the collection, analysis and internal dissemination of information; scope and relevance of gathered information)

# 2.5.1 The information system (mechanisms for the collection, analysis and internal dissemination of information; scope and relevance of gathered information)

Appraisal of the degree of development of this item of the internal QA system:

Partial

### 2.5.2 Grounds for the judgement issued by the Auditing Team:

The RAA informs that the IPV Information System (SI) is supported by several electronic platforms that enable the collection, treatment of data and provision of information to the different internal and external stakeholders. According to the RAA the SI/IPV is a computer-based system that includes the collection of information in non-computerized processes in some services and in interaction activities with the outside.

The system includes several data collection platforms. The following are the most relevant: student access (CSS Backoffice and CSSNet); academic management (SIGES and NetPa); support for teaching activities (moodle and curriculum data management system) and monitoring the perception of (SIGQ Platform and LimeSurvey). The information produced is on the Statistical System platform to respond to the questionnaires of the Directorate-General for Higher Education (DGES) and on the IPV intranet, which includes regulations and updated documentation.

The IPV also has other platforms, such as Adocs, for the assessment of lecturer performance; SIVA, for the service of insertion in active life; Koha for library management, Geslabs for space management and E-Public, which is a management software.

This is an information system made up of a large number of applications with different suppliers, whose integration presents a serious challenge to IT services. It has capacity for data collection, but will have difficulty in the automatic processing and production of information necessary and appropriate to the needs of the institution's management bodies.

The difficulty of integrating the platforms represents an increased effort resulting from redundancies in the data collection for the different applications, whose existence was confirmed during the meetings. At the level of processing and producing information, this difficulty involves the manual collection and insertion of data, which represents a risk of losing information. The differences in the parameterization of applications also prevent the harmonization of data to produce coherent and necessary information for decision-making.

That condition results from the enormous fragmentation of the SI in autonomous applications, some of which are dispersed over the different UOs and their own support services. This situation is shown in the 3rdpoint of the RAA "a summary of the aspects identified for improvement", where the difficulties of the system in improving access to information and making it available to the actors involved in the SIGQ are mentioned. That point also presents specific actions to be undertaken with which the CAE fully agrees.

The CAE cannot fail to mention the absence of a platform to document management and workflow in an institution where the SIGQ is so closely linked to a system of procedures.

During the meetings there was clear recognition of the fragility of the SI and the desire to improve it through the submission of an application to the Administrative Modernization Support System (SAMA). However, the CAE has only been able to confirm the willingness to prepare a computer-based project to the extent required to harmonize the different practices and to integrate the various platforms used in the SI.

Therefore, the CAE recommends reflection about the information system, which should consider the production of information appropriate to the needs of decision-makers at the various levels of the SIGQ as a priority.Without that, many monitoring procedures are at risk, as is continuous quality improvement.

### 2.6 Publication of information relevant to external stakeholders

### 2.6.1 Publication of information relevant to external stakeholders

### Appraisal of the degree of development of this item of the internal QA system:

Partial

### 2.6.2 Grounds for the judgement issued by the Auditing Team:

The IPV states it provides regular information to its diverse publics through the institutional webpage, displaying the statutes, the most diverse regulations in force in the institution, the Strategic Plan, the activity plans and respective reports, as well as the Quality policy and the MQ.

It is possible to consult information about the courses, their respective study plans and professional offers, as required under current national legislation. However, the CAE found that a wide range of information is missing:

1. The self-assessment reports of the study cycles are not yet publicly available, although the institution has already mentioned this in the RAA as a need for improvement.

2.Accreditation of study cycles, mentioning the date of accreditation and its duration, and the number and date of registration on the institution's website is not announced.

3. There are study cycles that refer to the A3ES website for information about accreditation. In such cases, no information is provided on the date and time of accreditation, nor registration, and the external assessment reports and self-assessment reports of the study cycles are not immediately accessible.

4.It is not possible to find information on the qualification of teaching staff, their contractual relationship with the institution, or the UCs taught, according to the applicable legislation and according to the ESG guidelines. 5.The information about each UC (learning outcomes, fundamental bibliography, etc.) is not accessible to

external stakeholders. The general assessment regulations are available, but there are flaws in the public information, in each course, about the methodologies of teaching, learning and student assessment.

6.There is no evidence of disclosure of the results of academic success and employability. Regarding employability, it is recognized in the RAA that the mechanisms for data recollection have not been applied in a systematic way. The IPV states that the information will be collected regularly and treated in the SIVA for further disclosure in the area of these services on its institutional page.

7. The information about mobility available to both internal and international potential applicants is insufficient and limited to links to external websites.

The CAE considers that it is necessary to make a serious effort in order to comply with the entire legislation in force and for articulation of the information base, which will improve the presentation of the institution and access by external stakeholders.

# 2.7 Monitoring, evaluation and continuous improvement of the internal quality assurance system

### 2.7.1 Monitoring, evaluation and continuous improvement of the internal quality assurance system

Appraisal of the degree of development of this item of the internal QA system:

Substantial

### 2.7.2 Grounds for the judgement issued by the Auditing Team:

The RAA states that the SIGQ is reviewed annually at a CAQ meeting and that this review includes the verification of: the adequacy of the quality policy; the performance of processes; internal audits; the implementation of corrections; corrective actions; preventive actions and/or improvement actions; evaluation of the satisfaction and adequacy of human resources, material resources and infrastructures related to each process.

The CAE noted that the IPV has a planning system to carry out revision of the MQ, as well as internal audits and other actions derived from the audit. However, the MQ does not present any evidence of the revisions made and the dates of the current version or last revision are not known.

The RAA indicates the Quality Score (BQ), monitoring of the audit program and reports on the effectiveness of the UOs as monitoring instruments of the SIGQ. The proposals for improving the UO reports highlight the need to increase the response to questionnaires and course reports, but do not specify what actions to take in order to achieve that objective. The CAE considers that the IPV needs to make a deep reflection about the causes that result in low response rates and to plan specific, bold actions to face the situation.

The BQ presents an extensive description of the monitoring of activities developed in the scope of the various procedures, detects non-conformities and analyzes the effectiveness of the system regarding fulfillment of the processes. The CAE considers that, while monitoring of procedures is essential for the operation of the system, and should therefore be maintained, a exhaustive analysis of compliance at the process level should be reserved for the audit monitoring report.

The synthesis of the document, currently called quality assurance, in the area of service system operation and critical reflection on the functioning and effectiveness of the system in promoting the improvement of the whole system's performance should be performed as a meta-evaluation and treated in a document called Quality Score.

The practice of monitoring the SIGQ and the ongoing reflection on its conceptual structure and functioning should be formalized and should also be part of the BQ. This document should focus on analyzing the system's effectiveness in order to avoid situations such as those currently observed regarding non-conformities that persist over successive years. This should be well articulated with the audit monitoring report and obtain input from the different stakeholders in order to achieve the motivation required to lead to the creation of a true quality culture without an associated character of penalty.

The document currently called "quality balance" should be referred to as an audit monitoring report, which corresponds to its actual content.

The synthesis of the efficacy, at the mission area level and the critical reflection that identifies the main fragilities of the SIGQ to support improvement proposals such as those presented in the RAA should be reserved to the BQ.

In conclusion, it can be said that the IPV has mechanisms to monitor, evaluate and improve the SIGQ, and that these mechanisms work regularly. However, in order to achieve the desired effects, there is a need for greater stakeholder participation, as well as greater concern about the effectiveness of the SIGQ, particularly concerning the main areas of the institutional mission.

### 2.8 The internal quality assurance system, taken as a whole

### 2.8.1 The internal quality assurance system, taken as a whole

Appraisal of the degree of development of this item of the internal QA system:

Substantial

### 2.8.2 Grounds for the judgement issued by the Auditing Team:

The SIGQ-IPV has a support structure, a manual of procedures that constitutes a reference for any action at an internal level and guarantees its operation. It has a planning system based on a methodology that defines objectives based on the Strategic Plan, projected in the activity plans and monitored in the activity report. This component is considered in the RAA as one of the main strengths of the SIGQ. However, the CAE verified the presence of insufficient articulation between the PAs at various hierarchical levels and these with the RAs. The CAE has not been able to obtain enough evidence of the effectiveness of the system translated into the evolution of institutional progress indicators in its mission areas. Nor has the CAE obtained evidence of the elaboration of intermediate reports of critical reflection at this level.

The effectiveness of the system is linked to the presentation of the MQ, which is another Handbook of Procedures and does not include mechanisms to promote stakeholder participation and development of the continuous improvement cycle in some parts of the system. The result is a lack of active participation by students and delays in the preparation of reports by teachers, as well as little progress of quality culture. Regarding the education dimension, there are well defined processes in the design and approval of the educational supply, student admission and monitoring of teaching-learning (E/A). Monitoring is through questionnaires applied to students and in course reports and UCs that need to be harmonized.

Concerning investigation, procedures are defined, there are CIs that have the essential conditions, but there is no evidence of clear progress in the quality of investigation made. In order to achieve this, CIs need to define scientific requirements and quality criteria for publications in international scientific journals, which might motivate the progress of researchers.

As for interaction with society and internationalization, there are monitoring procedures and instruments defined to guarantee monitoring and improvement of the activities developed, and the IPV regularly discloses information to external stakeholders through its portal.

In personnel management the CAE noted there are recruitment and selection procedures supported by the identification of needs and profiles. There are performance assessment regulations and training plans. However, the CAE has observed some complexity in the Regulation for Performance Assessment, which makes it difficult to apply it as a tool for continuous improvement.

The support services have extensive experience in implementing the quality system. However, there is insufficient critical reflection in order to promote improvement and change, perhaps due to its dispersion over the different UOs and "by the negative connotation associated with non-compliance processes" (point 3.1 of the SIGQ) There is no synthesis report of the services, which the CAE considers necessary for critical reflection of the installed model, compared to a shared services model, perhaps more efficient and with lower expenses. The information system consists of a set of autonomous applications that reveal difficulties in collecting data and presenting problems in the treatment and dissemination of information. This situation results from the fragmentation of the system into autonomous automatic applications, some of which are dispersed over the different UOs. The absence of a document management and workflow platform in a quality system so strictly based on a procedure system is also critical.

The gaps in the system are filled with a great deal of manual data processing, which can result in the loss of information. The functioning of the system as a whole is ensured by articulation between the parts of the planning system and the involvement of those responsible for the SIGQ, and internal and external stakeholders.

### 3. Strenghts and best practices

### 3.1. Main strengths of the audited system:

- The strong commitment of leaders at the highest level to establishing an internal quality assurance system which, besides improving the institution's activities, is an integral part of the strategy to promote better coordination and helps to strengthen its external promotion.

- The regulations, which are part of the Manual of Procedures, frame the great majority of the processes carried

out in the IPV, facilitate the services' functioning and are a good starting point for development of the information system.

- The acceptance of the principles of assessment and improvement by non-teaching staff and the familiarization and acceptance of the assessment procedures related to teaching and learning by the teaching staff, despite some limitations in participation.

- A clear definition of responsibilities and functions in the management system procedures.

- The existence of an internal audit program.

### 3.2. Best practices recommended for diffusion:

n.a.

### 4. Recomendations for improvement

### 4.1. Recommendations considered being essential (issues requiring corrective action)

The CAE considers that the IPV SIGQ presents some more important fragilities concerning definition of the documentation of the institutional policy on quality, in support services, the information system and publishing relevant information for stakeholders.

To solve these problems, the CAE considers it essential to implement the following recommendations:

A) Immediatly Implement:

1. Publication on the institutional website of the following information:

a.All reports of self-assessment, external assessment of the study cycles and institutional assessment, in order to comply with article 16 of law 38/2007.

b.Announcement of the accreditation of study cycles conferring a degree in the terms of article 59°-A of DL 65/2018.

c.Comply completely with the guidelines contained in n° 2 of article 162 of Law n° 62/2007 and sub-heading e) ii) of article 18 of Law n° 38/2007 and the guidelines of the 1.8 standard of ISG, including the qualifications of teaching staff, their bond with the institution and the UCs taught, as well as information about academic failure and employability.

2.Correction of the indicator monitoring the completion dates for course and UC reports elaborated by lecturers.

*B)* To implement within 1 year:

1.Elaboration of a Quality Manual that follows more closely the references of A3ES and which covers all IPV activities. Considering the current experience of the MQ, the CAE recommends its elaboration should be based on very wide discussion at the various hierarchical levels, and principally, that it should include the commitment of all UOs.

The reviewed MQ should include the description of the requirements for elaboration of the report on the accompaniment, assessment and continuous improvement of SIGQ, involving the institution at the highest level, so as to form a true reflection of the quality and to be a reference for critical reflection on the system itself. 2.Regarding documentation of the institutional policy on quality, it is necessary to elaborate the following intermediate summary reports:

a.Annual report on monitoring teaching quality based on indices for the institution, for each UO, course and UC, constructed based on a representative sample of the results of questionnaires applied to students to obtain their perception of teaching quality.

b.Annual report of satisfaction with the quality of services, constructed based on a representative sample of the results of questionnaires on users' satisfaction with service quality.

c.Report of the activities of inter-institutional collaboration and with the community including information from all UOs and the ADIV.

d.Report of institutional indicators to allow clear, summarised assessment of the development of institutional progress and the contribution of each Organic Unit.

3.Revision and harmonization between the different UOs of the report of UC (RUC) and of courses (RAC), so as to include the main indicators of academic training and including the appropriate references for presentation of proposals for continuous improvement.

4.It is also necessary to develop strategies to increase the effectiveness of internal audits of support services, so that all the non-conformities identified can be corrected immediately. This aspect should be considered in the service reports, which should be obligatory, for public announcement and include critical reflection about the activity carried out and analysis of the results of the user satisfaction survey to provide a grounding for presentation of improvement proposals.

5. To overcome deficiencies in announcing information to external stakeholders, the institutional website must

be developed. This should include dynamic, up-to-date information about the most relevant events, meet all legal requirements concerning the publication of information and adopt a logic of accountability, including publication of institutional indicators and plans and reports of UO activities.

C) To achieve within 2 years:

1. The necessary actions must be taken to automate procedures and routines in some areas, and improve information circuits to achieve greater integration of the various platforms of the information system. This implies the importing of meta-data and the corresponding digital objects so as to avoid the losses, out-of-date content and redundancies currently existing, which detract from the effectiveness of the SIGQ. As this is a very complex process affecting the whole institution, the CAE considers that IPV will only be in a position to present evidence of better integration of the system in a minimum of 2 years.

### 4.2. Additional recommendations for the consideration of the higher education institution:

The CAE presents IPV with a number of topics for reflection and further recommendations, the implementation of which is considered to be of great importance in improving its internal quality assurance system (SIGQ).

1 – Consider the possibility of including a greater number of students in the Quality Assessment Council, together with some external individuals with experience in the area of quality.

2 – Elaborate Activity Plans based on institutional indicators in order to show the contribution of the different UOs to institutional performance.

3 – It also seems essential to introduce mechanisms, spaces and projects to incentivise pedagogical innovation, recognition of merit and reflection on the educational model able to induce improvements in teaching and learning practices. For example, the CAE recommends reflection on the definition and announcement of objective criteria to identify UCs corresponding to "good practices".

4 – Increase student participation in the quality system and define strategies to increase the student response rate to questionnaires.

5 – Announce public information on the CI portals about regulations, including definition of the minimum criteria of scientific productivity, to admit members and a reference of international quality for publications in scientific journals with capacity to promote quality improvement.

6 – Develop support for research with science management capacity to support CIs and researchers in preparing applications for competitive financing and in managing research projects.

7 – Deep reflection on the regulations for assessing the performance of teaching staff, so that these are seen as an instrument of motivation and continuous improvement and a means of collecting information. This should be used to prepare systematic training plans for lecturers in articulation with performance assessment, as well as instruments for monitoring and assessing plans. It is also necessary to give value to activities of collaboration with the community in the performance assessment regulations.

8–Develop plans for taking on staff and for new, more agile recruitment mechanisms in order to meet the challenge of aging human resources.

9 – Develop the necessary actions to automate procedures and routines, and improve information circuits to achieve better integration of the information system and automatic production of indicators and to facilitate their systematic announcement to the different internal actors. It therefore becomes necessary to strengthen the connection between the management system and the quality system concerning the survey and exhaustive coverage of information and the automatic production of indicators.

### 5. Other Comments

### 5. Other Comments

nThe CAE considers that the IPV has already carried out three of the four essential recommendations indicated to comply immediately in the preliminary report. However, the guidelines contained in paragraph 2 of article 162 of Law 62/2007 and in sub-item e) ii) of article 18 of Law no. 38/2007 and the guidelines of ISG standard 1.8 have not yet been fully implemented.

Regarding the other essential recommendations to be implemented within one or two years, the CAE confirms

that this work is on track and that the IPV can comply with the recommendations within the proposed timeframe.

## 6. Conclusion

# 6.1. The internal quality assurance system fulfils the minimum requirements for its certification, in accordance with the criteria defined in the Audit Manual?

Yes, subject to conditions

# 6.2. Conditions to be met by the institution and the corresponding deadline, in case a conditional certification is proposed

The internal system of quality assurance meets the requirements for its certification on the condition that it confirms overcoming the situations considered limiting in the list of essential recommendations (section 4.1).

### 6.3. Grounds for the judgement issued in 6.1

The aspects of documentary definition of the institutional policy on quality (2.1), support services (2.2.5), information system (2.5) and announcing relevant information to external stakeholders (2.6) were considered to be in "partial development". All the other aspects were assessed as being in "substantial development".

For each of the aspects:

2.1 - There is a clear, well-defined support structure, with clear objectives, functions and responsibilities, and it includes the main people responsible. However, there is no harmonization of the teaching monitoring reports and there is insufficient articulation of plans, and of these with the activity reports, which together, prevent the elaboration of intermediate summary reports essential to assess the aspects of the institutional mission. This lack of harmonization in the documentation and the absence of a more wide-ranging MQ based on the references of A3ES contribute to reducing the effectiveness of the SIGQ in the implementation of the quality policy.

Considered in partial development.

2.2.1 – There are the most procedures essential to assure quality regarding the new educational supply, assessment and continuous improvement of the supply in terms of UOs and that the system established treats the information and allows detection of instances of insufficient quality. It also found mechanisms for monitoring improvement plans at the UO level, and instruments to confirm the originality of academic work. However, there is insufficient involvement of internal stakeholders in responding to questionnaires and insufficient harmonization between course reports and those of UCs and UOs; and these do not yet include some fundamental indicators of teaching quality. Nevertheless, the CAE was able to confirm that each UO has procedures with the capacity to promote improved teaching quality which it is important to systematize, harmonize and integrate in the SIGQ.

Considered in substantial development.

2.2.2 – The CIs are represented on their own webpages accessible through the IPV portal. These pages include information about research teams, publications and events. Although there is no central structure of research coordination and the CI regulations do not present references to requirements of scientific quality, it can be considered there is capacity to detect instances of insufficient quality in the activity reports. Considered in substantial development.

2.2.3 - The CAE noted the satisfaction of external stakeholders and also that these recognize the relevance of IPV for the region's development. Although there is not yet a report of institutional collaboration and with the community, there are mechanisms to promote, monitor, assess and improve activities developed with and for the outside. Therefore, it is considered that most quality assurance procedures are fulfilled, that the system has the capacity to detect instances of deficient quality. Considered in substantial development.

2.2.4 -IPV has appropriate regulations to ensure the recruitment, management and training of it teaching and non-teaching staff. It also has mechanisms for assessing the performance of non-teaching staff and regulations for teaching staff assessment, which allow identification of situations of insufficient quality. Scientific merit is recognized in the RA but there is no system of incentive or recognition of pedagogical merit. These procedures confirm there is collection of information and identification of insufficient training, and these can be used as a management tool and to improve the quality of teaching and non-teaching staff performance.

Considered in substantial development.

2.2.5 – The experience accumulated, ineffectiveness is found in correcting the non-conformities detected in internal audits to service. A low rate of response to user satisfaction surveys is also observed and insufficient critical reflection leading to proposals for improvements in the activity reports. Also because some services do not elaborate activity reports and present different degrees of SIGQ implementation, it is considered there is no capacity to detect instances of insufficient quality and the conditions are not met to promote improvement and change.

Considered in partial development.

2.2.6 –Participation in activities of an international nature is monitored in interviews and in reports drawn up from questionnaires applied on arrival. Because there is also a peer "mentoring programme" to stimulate the reception of foreign students, it can be considered that the procedures to promote, monitor, assess and improve internationalization are defined and are sufficient to promote improvement and/or change when instances of deficient quality are identified.

Considered in substantial development.

2.3 - The SIGQ is interlinked with strategic management activities through participation by the main people responsible and the planning system developed by the institution. Although the Activity Plans are mainly a means of monitoring actions to be carried out, the content of the Activity Report presents results in terms of indicators demonstrating interconnection and monitoring of the activity, and so is an element of information production with the capacity to support decision-making and promote improved performance at the various levels.

Considered in substantial development.

2.4 – The CAE confirm that students and teaching and non-teaching staff participate in the SIGQ. It was also found that external stakeholders participate although often that collaboration is of an informal nature and not reported in the system itself. Although student participation is limited, lecturers get delayed in elaborating UC and course reports, the CAE considers that the institution recognizes this fragility and already has strategies to solve problems and in this way promote development of a quality culture. Considered in substantial development.

2.5–The SI is formed of a large number of computer applications developed by different suppliers with an insufficient level of integration. This situation implies manual collection and treatment of data, bringing the risk of losing information, redundancy and becoming out-of-date. The very fragmented system and the inherent differences in parametrizing the applications is a serious challenge to the production of coherent information necessary for decision-making processes.

Despite finding evidence of knowledge and informal treatment of some data, their systematic, transversal recording in the SI was not confirmed. The SI appears as very fragmented and unable to produce appropriate information for the needs of decision-makers at the various levels of the SIGQ and to contribute effectively to monitoring and continuous improvement of quality.

Considered in partial development.

2.6 – The institution has identified external stakeholders and their perspective is considered in planning, but not consistently. Information is collected, but it is not made known systematically. IPV's institutional website is not sufficiently developed and articulated with the SI. The CAE considers it is necessary to carry out further developments to comply with the legislation in force concerning the announcement of information to external stakeholders and better articulation in the information base. Considered in partial development.

2.7 – The institution monitors the functioning of the SIGQ through the report entitled "Quality Balance". This report presents extensive monitoring, very centred on following procedures, with the summary chapters presenting the draft of a true quality balance. Therefore, the CAE proposes that these chapters should form this document and that the others should be considered as a summary report of internal audits. Summarising, it can be considered that IPV has mechanisms to accompany, assess and improve the SIGQ, and that those mechanisms function regularly. However, to achieve the desired effects, there must be substantial reflection about the SIGQ and its functioning focused mainly on analysing the implementation of improvement plans. Considered in substantial development.

2.8 – IPV's SIGQ covers most of the institution's activities and presents evidence of effectiveness in promoting continuous improvement. It forms a whole that works, despite presenting some main weaknesses regarding the documentation of institutional policy, support services, announcing information and the information system. Its effectiveness would certainly be improved by increasing critical reflection on the system at the various levels and if students were more effectively involved in developing the system. Considered in substantial development.