ABOUT ELECTRONIC ASSESSMENT, ACCREDITATION AND MANAGEMENT OF THE QUALITY OF TEACHING IN HIGHER EDUCATION

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Abstract. *The article examines the main approaches to external evaluation and accreditation in higher education. It also presents COMPASS-OK: a social network for electronic evaluation and management of the quality of education, which utilizes mechanisms for management of documentation flows and supports tools for modeling of evaluation methods and procedures.*

Introduction

Contemporary education is a combination of processes, forms of organization, methods of planning and management, *systems for evaluation and control*, as well as tools for coordination, based on separated (in space and time), heterogeneous (human, information, communication and material) and diverse (in character and functionality) technologies, activities, methods and resources for learning and skill-building, with the participation of individuals with dynamic roles [1].

The article examines a particular aspect of modern education as expressed in the above definition – the systems for evaluation, certifying and management of the quality in higher education (HE). Special attention is paid to *two factors* that significantly affect the education system as a whole – large-scale introduction of information and communication technologies and dissemination of various forms of e-learning. As a result of the conducted survey a model has been proposed of a system of type *social network for evaluation and management of the quality in HE*. Besides that, a software prototype (called *COMPASS-OK*) that uses tools for modeling and management of methods and procedures for evaluation and accreditation of education has been designed and implemented. Also, a specific technique has been developed for assessing the quality of distance learning (DL) in higher education institutions (HEI), designed and tested with *COMPASS* tools. Based on the achieved results and conducted experiments is a project for further improvement of the software system aimed at creating a national system for evaluation, accreditation and management of the quality of education in HE.

Practices for institutional evaluation of the quality of education

We must note that depending on who performs the evaluation of the quality of education, it is defined as internal or external. The *internal evaluation* is done by persons or committees authorized by the bodies that govern the relevant educational institutions. In most cases, the *external evaluation* is carried out by independent organizations or agencies licensed at regional or national level and is based on legally approved methods and procedures.

There are a number of studies and experiments related to the methods applied in the internal evaluation of various aspects of the quality of education (for example management, educational activities, scientific activities and necessary equipment, in particular – teacher's qualification; electronic learning resources; curriculum; environment for management of education and many others). In external evaluation, **four main types of procedures** are applied in practice [2]:

- *audit of the quality* of the internal system for assurance of the quality of basic units or programmes of an HEI (auditing).
- *comparing the quality* of education in various universities for a specific educational field (benchmarking).
- *ensuring* the implementation of a *number of predetermined criteria* (institutional or programme evaluation and accreditation).
- *recognition of high quality* (excellence).

Most European countries have their own national institutions with established general criteria for external evaluation of the quality of HE and in particular - of distance and e-learning. For example, in Norway in 1993 NADE (Norwegian Association for Distance Education) published criteria for evaluating the quality of DL. In the UK, organizations such as JISC (Joint Information Systems Committee) and HEA (Higher Education Academy) collaborate on methodological development and evaluation of e-learning. The Australian Council ACODE (Australasian Council on Open, Distance and E-learning) published detailed criteria aimed at influencing the policy and practice at institutional, national and international level. In the U.S., CHEA (Council for Higher Education Accreditation) has prepared guidelines for accreditation and assurance of the quality in distance learning, and DETC (Distance Education and Training Council) has published a Guide for accreditation of the institutions for distance learning.

In Bulgaria, the external evaluation of the quality in higher education is conducted by the *National Evaluation and Accreditation Agency*, which carries out institutional and programme accreditation of HE. The quality of DL offered in HEI is a function of a) the quality of HE and b) the quality of procedures and tools used in the learning process (planning, organization and conducting of DL, educational documentation, technical equipment etc.). Legal basis for this is the *'Ordinance on state requirements for the organization of distance learning in higher education institutions'*, published in 2004 [5].

The methods used in the practice of NEAA evaluate various characteristics of the evaluated objects and is organized at several levels: areas for assessment, evaluation criteria, characteristics of the criteria and indicators. Each area is relatively

independent of the others and is assessed by multiple criteria. The characteristics detail the criteria content and are assessed on the basis of multiple indicators.

The procedures for institutional and programme evaluation and accreditation in NEAA are related to the creation (including collective), coordination, acceptance and exchange of multiple documents between various participants. The varied procedures, the inclusion of participants with different rights and duties, as well as the great number of documents operating within the process of evaluation and accreditation of the quality of education *call for automating the management of the flow of activities and documents*.

At the programme level for 2008, according to the European Association for Quality Assurance in Higher Education (ENQA), 25 of 38 European agencies conduct assessment and accreditation, 7 conduct audit and only 3 - comparison of the quality of education in a certain educational area at various universities. The procedures for institutional or programme evaluation and accreditation in HE usually have four stages: a) preparation of self-assessment report of the HEI according to criteria set by the evaluating institution; b) site visit by an expert group and conducting external evaluation; c) publishing of an evaluation report containing decision and recommendations for improvement of the quality of education in the relevant HEI; d) post-accreditation monitoring and control.

COMPASS-OK: A social network for management of the quality of education in HE

We believe that education in an information society is ***socially oriented, provided for by high technologies, resource-based and open*** (for cooperation, for lifelong learning, standardization, sharing, etc.). Confirmation of the social and open nature of education (and the related systems of management), for example, are:

▪ the simultaneous occurrence and maintenance of thousands of procedures of the same kind in dozens of educational and academic bodies and institutions;

▪ the need for exchange and coordination of a significant amount of information (including archiving of documents for the same procedures);

▪ creating and maintaining national registers (including experts, doctoral candidates, PhDs, dynamic procedures, etc.);

▪ the need to ensure effective and transparent procedures for control and management at national and institutional level, and others.

The specified social characteristics of the educational process and the control of its quality put the following issue on the agenda:

> Is it possible to establish a ***National Automated System for 'maintaining' the quality of HE*** that would encompass: *diverse procedures* and a wide range of incorporated and participating in a dynamic process *various institutions involved* (NEAA, Ministry of Education, Youth and Science), *organizations* (universities, institutes, laboratories), *units* (primary and structural), *users* (experts, teachers, students, etc.)?

The answer to this question is the development and implementation of a software prototype, conventionally called *COMPASS - CO*nceptual and computer *m*odeling of Methods and *P*rocedures for evaluation and *A*ccreditation (*S*et to be applied in various areas for quality management). The development follows several *basic principles*:

▪ the delegation and using of rights does not follow a strict hierarchical scheme (eg: every registered user can request and perform other roles; administrators of a higher level authorize structures and users of lower levels, etc.);

▪ information (data, procedures) is entered on the principle "the first to request is the first to enter";

▪ procedure / information on each level is officialised (and published) after sanction of the respective administrator, and so on.

In short, ***COMPASS can be regarded as a specialized 'social network' for evaluation and management of the quality in education.***

Main stages of the development are: a) elaborating a technology, methods and tools for modeling and managing workflows of activities related to the assessment of the quality in HE, and b) development and creation of *COMPASS* and conducting real experiments in the field of evaluation and accreditation of higher education.

Basic functional requirements for a system of the projected type are:

▪ to provide tools for defining indicators and modeling various methods for evaluation of the quality in education;

▪ to enable evaluation of different objects - educational institutions, educational programmes, e-tests, environments for e-learning, etc.;

▪ to enable modeling of diverse procedures for (self-) evaluation according to the practice of the different institutions;

▪ to automate the preparation, processing and exchange of documents between the evaluated institution and the evaluating one;

▪ to enable self-assessment of the educational institutions;

▪ to generate documents (prescriptions, reports, tables, etc.) necessary for (self-) evaluation and accreditation;

▪ to provide real-time information on the status of open procedures and maintain records of completed procedures, and so on.

The *COMPASS* software prototype, developed and implemented on the basis of the formulated functional specifications, consists of two relatively independent modules: *COMPASS-OK* (for evaluation and (self-)assessment of the quality in education and accreditation of HE) and *COMPASS-AS* [8] (for management of the procedures for development of the academic staff).

Modeling of methods and procedures for evaluation and accreditation

In general, the methods of evaluation and accreditation look at different aspects of the evaluated objects. Typically, for each aspect (area) the evaluation examines many of its characteristics, organized in one or more hierarchical levels, each characteristic being assessed through appropriate indicators. Therefore, the

methodology could be modeled by a tree structure, in which the nodes at each level (areas, characteristics, etc.) are based on the assessments of the nodes at the previous level. The leaves of the tree are the nodes representing the measurable indicators [7]. The developed pattern enables secondary grouping of the indicators in two or more common objects or processes, which makes it possible to evaluate additional aspects of education. For this purpose, when modeling the methodology, the first step is to determine the important areas for evaluation; secondly, when configuring the indicators relating to the methodology, each indicator should be 'positioned' (by setting its 'coordinates') in the space created for assessment, along with instructions about which characteristics of the most significant areas it is relevant to. A similar example for categorization of indicators is 'e-guidelines cube' [10], developed at Massey University (New Zealand).

In *COMPASS-OK*, each **basic methodology for evaluation** is presented in the form of a tree structure, called **a template**. When creating a template methodology, the nodes of the respective tree representing criteria, indicators, characteristics, etc., are to be described in the system, setting (for each of those nodes) the fields that must be completed when creating a specific methodology. The node at the highest level (in this case - an area) can be marked as an aspect and used for "evaluation of aspects". The indicators are marked as objects with independent quantitative assessment (by default they are calculated as an average value over the nodes of a lower level; the assessment of each node can be set to include pre-specified weight). Text boxes (necessary for generating a report with recommendations) are provided for each discrete value of the indicators.

Accreditation procedures take place following a general scheme (Fig. 1).

Each procedure for evaluation and accreditation is presented in COMPASS-OK by means of a conceptual model incorporating the workflow of the activities that must be implemented and resources necessary for that ([6]). The conceptual model defines the workflow of activities, tasks and events. One or more users are responsible for implementing the tasks included in each stage of the procedure. Once a respective task is completed, the following tasks in the workflow are undertaken with the provision of the necessary resources and automatic inclusion in the so-called 'portfolio' of each user responsible for their implementation. The model of the procedure is set with the following parameters:

- conditions for starting and completion;
- restrictive conditions,
- preconditions and sequence;
- participants (by roles and specific tasks);
- input and output documents/data;
- resources necessary for the successful implementation and others.

Each separate task (step) included in the workflow presenting the procedure is generally determined by three parameters:

- *input* (information, resources and prerequisites necessary for the implementation);

- *transformation rules for the transition to the next step* (determinant activities that can be executed by a user in a certain role);
- *output* (new information - result of the implementation of the current step used as input for further steps in the workflow).
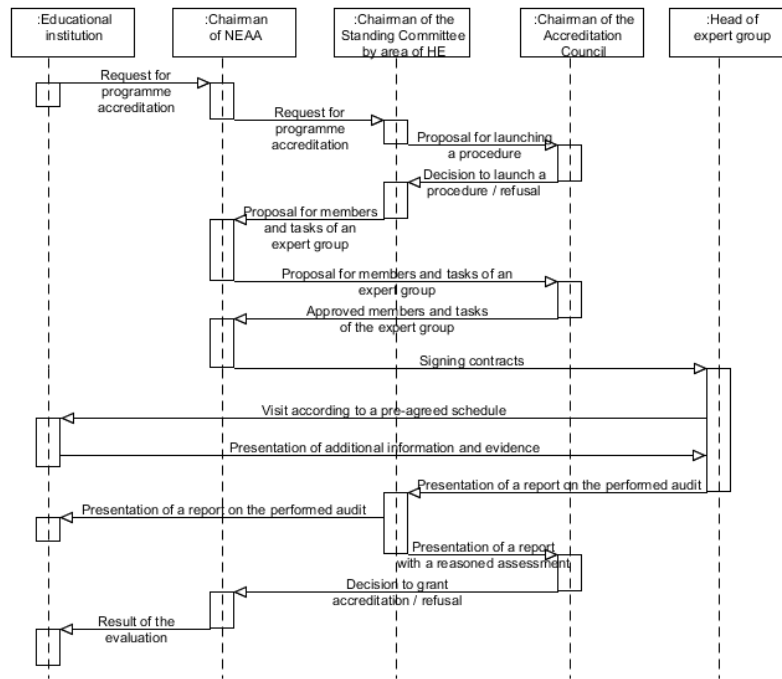

Fig. 1 A typical procedure for programme accreditation of an academic specialty

Methods for evaluating the quality of dl in HEI

The research also puts forward a model of a methodology for evaluation of the quality of DL, consistent with the practice of NEAA [3, 4]. The development (presented in the section referring to indicators of the quality of e-learning) is based primarily on the E-xcellence Project [9]. There are nine independent areas for evaluation: Strategic Planning, Curriculum design, Course design, Student assessment, Course delivery, Resources, Staff support, Student support and Self-Assessment of the Quality of e-Learning. Two of these areas (Student assessment, Self-Assessment of the Quality of e-Learning) are new – they are not presented in the E-xcellence Project.

A large number of criteria, characteristics of the criteria and specific indicators have been put forward for each evaluation area.

The developed methodology for evaluation of the quality of DL contains more than 200 indicators such as: a) indicators which are essentially used in the E-xcellence Project, but modified in a way that enables their quantitative evaluation;

b) indicators which take into account the operative Ordinance for organization of DL in HEI [5]; and c) new indicators resulting from the logic of the conducted research.

The following table presents some indicators belonging to the "Course delivery" area, taking into account the specifics of the Bulgarian legislation.

1	Internet-based Learning Management System (LMS) with a guaranteed high-speed access.
2	DLS supports options for organizing and conducting DL.
3	DLS supports an integrated database of personal data.
4	DLS supports curricula.
5	DLS supports virtual educational materials, exercises and tests.
6	Relative share of the educational materials and resources for self-training on the third and / or fourth technological level, used in the organization and conducting of distance learning to acquire an educational-qualification degree.
7	Relative share of the educational materials and resources for self-training, used in distance learning on a certain subject in relation to the educational content of the curriculum.

Conclusion

Within the research, a functional prototype of a system for evaluation of the quality of education has been created and tested. The system supports tools for modeling and configuration of methods and procedures for evaluation; management of users, procedures and documentation flows. The research also suggests a tested methodology for evaluation of the quality of e-learning in higher education.

The use of COMPASS-OK reduces the cost and time of evaluation and accreditation; ensures objectivity and candor of the respective procedures, facilitates the work of the expert groups in the systemization and analysis of the provided information; enhances the effectiveness of the accreditation procedures, and others.

COMPASS-OK can be used in internal and / or external evaluation of the quality of education, as well as for quality assessment of various objects and processes of the educational process - educational institutions, specialty training, software tools and environments used in the e-learning process and so on. The ability to model methodologies and define objects for evaluation enables the multiplication of the achieved results in the evaluation of other objects and processes, creating preconditions for wide application of the system. The free use of the developed system is expected to motivate and facilitate the self-assessment in HEIs and to significantly improve the quality of education.

Acknowledgments

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