ARTICLE

Design of a specific quality assessment model for distance education

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Abstract

Improving the quality of education systems is one of the major challenges of the 21st century. In many cases, this can be put down to the specific demands of accreditation regulations placed on higher education institutions and degree courses, and to the process of continuing improvement to meet the educational needs of a society whose expectations have changed considerably in recent

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decades. Assessment is carried out to identify problems or unattained objectives and to suggest improvements.

An assessment of a distance education institution should consider factors ranging from student achievement to the comprehensiveness of the teaching proposal within a particular context. Virtualisation applies not only to students, but also to every university function.

The aim of this article is to present the advances in the design of a quality assessment model that allows the Department of Distance Education in the Facultad de Ingeniería y Ciencias Hídricas (FICH) at the Universidad Nacional del Litoral (UNL), Argentina, to assess educational quality so that it can implement a process of continuing improvement on the degree courses that it offers.

Keywords

distance education, assessment, quality, indicator, accreditation

Diseño de un modelo de evaluación de la calidad específico para EaD

Resumen

El mejoramiento de la calidad de los sistemas educativos es uno de los grandes desafíos del siglo XXI, en muchos casos generado a partir de las necesidades específicas de las normativas de acreditación de las instituciones y carreras de educación superior, o como parte del proceso de mejora continua tendiente a satisfacer las necesidades educativas de una sociedad que modificó sus expectativas en las últimas décadas. Se evalúa para detectar problemas u objetivos no cumplidos y plantear mejoras.

La evaluación de una institución de educación a distancia (EaD) debe ir desde el logro del estudiante hacia la globalidad de la propuesta de enseñanza en un contexto particular. La virtualización no solo incluye la relación con el alumno, sino que abarca todas las funciones universitarias.

El objetivo de este trabajo es mostrar los avances en el diseño de un modelo de evaluación de la calidad, que permita al Área de Educación a Distancia de la Facultad de Ingeniería y Ciencias Hídricas (FICH) de la Universidad Nacional del Litoral, evaluar la calidad educativa para realizar un proceso de mejora continua en las carreras que gestiona.

Palabras clave

educación a distancia, evaluación, calidad, indicador, acreditación

Introduction

Improving the quality of education systems is one of the major challenges of the 21st century. Educational quality has been determined historically and culturally, and also constructed in each particular setting. This means that those elements defined as important at a given time and within a given context are not necessarily the same at another time or in another place. Thus, the most we can aspire to is to propose a broad approach that allows elements of quality considered as substantial to be identified at the relevant times and in the relevant places. Distance education has specific characteristics that distinguish it from traditional education, and these need to be studied objectively.

An assessment of a distance education institution should consider factors ranging from student achievement to the comprehensiveness of the teaching proposal within a particular context. Virtualisation applies not only to students, but also to every university function.

Since the mid 1980s, quality assessment of university education has been put forward as one of the main topics on the education reform agenda worldwide (Villanueva, 2005). Assessment in general and accreditation in particular have emerged as suitable tools for regulating, via the State, university education from the perspective of the quality of education services offered.

It is clearly important to create and promote assessment and accreditation mechanisms to assure and foster quality, and to provide for the transparency and comparison of educational offerings. Doing so will inevitably strengthen the international recognition of education institutions and systems. Increasing globalisation also affects education and the labour market, so under these circumstances the expediency of having a framework of reference that standardises criteria for assessment purposes is evident.

In Argentina, resolution 1717/04 of the Ministry of Education of the Nation regulates the distance education projects of public and private higher education institutions. This resolution and its subsequent amendments and additions stipulate the procedures that institutions offering distance education must follow in order to issue nationally recognised degrees.

The degree course regulations and accreditation processes do not contemplate the specific aspects of the distance education mode, which is something that we need to take into account when it comes to proposing a process of continuing improvement.

The aim of this article is to present the advances in the design of a quality assessment model that allows the Distance Education Department in the Facultad de Ingeniería y Ciencias Hídricas (FICH) at the Universidad Nacional del Litoral (UNL), Argentina, to assess the operation of processes involved in every aspect, both general and specific, so that it can implement a process of continuing improvement on the degree courses that it offers.

Quality models

Within the framework of reference to be adopted, the first term that must be clearly defined is 'educational quality'. The concept is polysemic, multidimensional and contextualised; it alludes to a feature of all things educational, to different levels (macro and micro) and to multiple dimensions of each level. Moreover, it expresses conceptions of education, values or criteria that are not always convergent. The focal point of its action is education, defined as an instance of socially valid knowledge construction and distribution.

The OECD (1995) defines quality education as the kind of education that ensures that all youths acquire the necessary knowledge, abilities, skills and attitudes to prepare them for adult life.

While definitions of quality vary according to individual and institutional perspectives, we can indeed find consensus on its attributes and conditions. Quality is referred to as 'prestige' or 'excellence' when describing the value of a programme, or as the cost-benefit ratio (Luque, 2007) when taking into account resources or results.

We could say that the culture of quality assessment has become a fixture of university education, providing users and other sector-related agents with information to enable them to take appropriate decisions. It is important to point out that one of the most important aspects of quality assessment is to set criteria, indicators and parameters for education institutions as a whole.

This assessment process, which is carried out in Argentina by the National Commission for University Assessment and Accreditation (CONEAU), has three clear impacts:

- Greater regulation and self-regulation of the education system.
- Setting institutional development guidelines to improve the quality of university teaching.
- Generating publicly accessible information, which gives the system transparency.

Distance education is on the up, due to the wide-ranging and varied academic offerings that it makes available. It is therefore crucial to define a suitable quality assessment model that provides the necessary tools to foster the continuing improvement of its services. Indeed, these services are considered agents of change in a society that demands a democratisation of knowledge from distance education.

Using a quality assessment model in a distance education institution allows the situation to be analysed systematically, thus enabling proposals to be made for the improvement processes required to attain the objectives set.

Assessment is always carried out to take decisions. Collecting data about the results of the educational process and issuing a rating is simply not enough; if a decision is not taken, then there is no real assessment.

Using a quality assessment model allows an institution's situation to be analysed systematically, thus enabling proposals to be made for the required improvement processes (Seuret & Justiniani, 2007).

Currently, there are several models available for measuring the quality of education institutions. Some of these models are: ISO 9000; Deming Prize; Baldrige Award; EFQM (European Foundation for Quality Management) Excellence; RUECA (University Network for Quality Assessment); García Aretio; Quality standards for distance education in Latin America and the Caribbean, etc.

We define the term 'indicators' as a set of distinctive characteristics of the object of study. These characteristics can be operationally identified and measured, and data defined as crucial to an assessment can be obtained from them. They express the operational function of variables included in an assessment, and measurement instruments can be constructed from them.

Indicator use has become generalised in most disciplines that seek to attain higher levels of performance. Indicators simply and accessibly express the relationship between two variables (real values/objective values) and therefore facilitate the measurement of results.

Basically, indicators are signs that indicate, in quality terms, how progress towards the objectives set is being made. Thus, they allow what is really happening to be measured against what has been planned. They are a tool for decision-making when it comes to assessing the efficiency of the educational process.

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Distance education dimensions that need to be assessed

In this process of creating a suitable quality assessment model, we have taken two models as the basis: the one proposed by CONEAU in Peru in 2009, entitled *Modelo de calidad para la acreditación de las carreras profesionales universitarias en la modalidad a distancia y estándares para la carrera de Educación* (Quality model for the accreditation of professional degree courses taken in distance education mode, and standards for the degree course in Education, CONEAU Peru, 2009); and the model put forward by Lorenzo García Aretio in 1998 as an integrating model for distance universities (García Aretio, 1998).

The quality assessment model that we aim to create must cover all the dimensions of a distance university degree course. We define the term 'dimension' as each and every macro element that allows the whole to be defined, which in this case is the education system being assessed. This model must contemplate all the factors directly and indirectly affecting education management in order to obtain an overview of each aspect of it. Factors are understood as a variable or set of variables affecting the quality of higher education.

The first dimension that must be assessed is *academic professional education*. We consider this to be a basic dimension, as it is the one that encapsulates the ultimate goal of any higher education institution. This dimension assesses the students' educational activity in teaching-learning processes. It allows a full assessment to be made of the three basic factors involved in this dimension:

- Teaching-learning: this factor is understood as the one that allows indicators to be obtained on how the teaching-learning process is carried out, taking into account the strategies implemented, the process assessment, the degree course curriculum, the students and the graduates.
- Research: this factor indicates the research projects being carried out, the assessment of those projects, and the students' and lecturers' participation in them.
- Extension and social outreach: this factor assesses the extension and social outreach projects, courses and other related tasks carried out.

The second dimension that must be assessed is *institutional and administrative management*. This allows effectiveness to be measured, as well as the consistency between the institution's mission and vision and the objectives set for continuing improvement. The factors in this dimension are:

- The institution's strategic planning, which must be consistent with the quality criteria set for the degree course (or courses) being assessed.
- The institution's organisation, which must propose mechanisms to meet the institution's requirements; the distance education mode – with its particular features and demands – must be taken into account so that every task can be carried out efficiently and effectively.
- Management and monitoring, which are observation activities that allow the organisation to prevent deviations and to minimise intervention when faced with mode-related difficulties.

The third dimension refers to *professional education support*, which allows us to assess the ability to allocate material and human resources and to manage them as part of the development of the teaching-learning process. In this dimension, we will consider the following factors:

- Lecturers: taking into account their teaching-learning work, an assessment will be made of their work schedules, tutoring schedules, distance education mode abilities, technology skills, familiarity with the defined virtual learning environment (VLE), etc.
- Equipment, platform and infrastructure: this factor allows us to assess the technological components needed to carry out the academic activities in distance education mode. An assessment is made of suitable infrastructure and equipment use in all areas: research, administration, extension, classrooms, etc.
- Student welfare: an assessment will be made of student welfare programmes implemented for the institution's students, lecturers, researchers and staff.
- Financial resources: assessment will be carried out to establish whether the financial resources are sufficient to attain the objectives set for the degree course.
- Association with degree courses and other similar areas: an assessment will be made of the planned tasks of association with other similar degree courses and social sectors that have interests in common with those contained in the degree course.

Having described these dimensions and their respective factors, the next stage is to define suitable indicators.

Quality indicators for distance education

Identifying inconsistencies between the basic components of a university institution is the first step in taking good decisions.

With that goal in mind, we propose amalgamating and sorting the assessment indicators into three major groups: functionality, effectiveness and efficiency.

Functionality

The functionality indicators must measure the consistency between the educational targets and objectives set by the institution, and the value system, needs and expectations of the community in which it is situated. In plural democratic societies, these indicators are somewhat difficult to define, firstly because of the diversity of social needs, aspirations and values that coexist in them, and secondly because of the lack of agreement on desired educational targets. Nevertheless, there are techniques available to determine levels of acceptance of values, targets and outcomes of university institutions, which are the main basis of the functionality indicators.

Effectiveness

The effectiveness indicators are based mainly on the assessment of outcomes, taking as a point of reference the targets and objectives of the system or institution.

Efficiency

The efficiency indicators are based mainly on the assessment of all types of costs (staff, time, social, material, financial, foregoing other achievements, etc.) that the results obtained imply. It is therefore a matter of expressing the resources-achievements ratio. The difficulty here also lies in the nature of these concepts within the university context.

Adapting conventional indicators to the distance education mode implies taking into account the potential effects that doing so may have. Some indicators can be transferred, though they do need to be specifically judged and interpreted. In other cases, specific indicators are required for the distance education mode. That is why we have added the following three mode-specific characteristics: availability, information and innovation (García Aretio, 1998).

Availability

This represents the consistency between the objectives set by the institution and the material, human and financial resources that it has available when initiating the process.

Information

The consistency between the results obtained and the improvement proposals. All information must be disseminated in a suitable way to obtain real indicators that are known to the community involved.

Innovation

The consistency between specific improvements and the decision to innovate. The model must propose new targets, new processes and new ways of dealing with any identified weaknesses.

Generated indicators

In the process of creating a suitable quality assessment model for distance education, we have contemplated, defined and adapted indicators from several of the models studied.

These indicators were arranged in tabular form and a unique identifier was assigned to each one, in accordance with the dimension being studied. For each dimension and factor, specific indicators were generated and adapted. In addition, a formula was developed to calculate each one, and the frequency with which each indicator should be measured was defined, thus enabling a clear, up-to-date overview of the institution's situation to be had.

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Taking into account the above-mentioned dimensions, dimension factors and indicator characteristics, we proceeded to define the indicators presented below.

Indicator template

In order to present each of the indicators in a simple, easy-to-understand way, we designed a table containing the data required to define each indicator. The template is shown below.

XX999	Dimension					
	Factor					
Description						
Formula						
Interpretation						
Assessment	Optimal		Minimum desired value		Real	
Data source						
Frequency						
Indicator		Efficiency		Availability		
		Effectiveness		Innovation		
		Functionality		Information		

A unique identifier for each indicator is placed in the top left-hand corner. The unique identifier consists of two letters for the dimension and a three-digit consecutive number for each indicator of that dimension.

The dimension and the factor to which it belongs are also shown at the top, next to the unique identifier. Then the indicator is described.

The next row shows the formula for generating it if it is quantitative, or the range and unit of measurement if it is qualitative. In the row after that, the objective or purpose of the indicator is described.

In order to assess the indicator, the following are specified: the expected optimal value (depending on the type of indicator, there may be a target measure that is expected to be reached); the minimum desired value that the institution considers to be the lowest limit that has to be reached; and the real value obtained.

Then the source of each datum used is shown. In other words, this specifies how the indicator is obtained: if the datum is generated in the Department of Distance Education or if it is has to be obtained from another body. Given the complexity of data administration and the system in which data are stored in the case of FICH degree courses, the source of the datum allows for data mining.

Then, the frequency with which each indicator should be measured to obtain significant values is shown.

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Lastly, the type of indicator being described is shown; it indicates whether efficiency, effectiveness, functionality, availability, innovation and/or information can be measured.

In an organised, simple way, this table shows the main data of each indicator in the quality assessment model for distance education that we are creating.

An example of a completed table for an indicator is shown below.

FP001	Dimension	Professional education				
	Factor	Teaching and learning				
Description		Justification of the degree course offered in online mode according to a study of social demand				
Formula		Admission index = Number of entrants / Number of applicants				
Interpretation		Allows selection and admission of students to the associated course to be compared against the entrance profile.				
Assessment		Optimal	1	Minimum desired value	Not applicable	Real	0.70
Data source		Number of applicants: CEMED[1] (external)				
		Number of entrants: CEMED (external)				
Frequency		Every degree course enrolment period				
Indicator		X	Efficiency		Availability	
		X	Effectiveness		Innovation	
			Functionality		Information	

In this indicator, the optimal value is 1, since it indicates that a potential entrant to the degree course (applicant) is eventually admitted. If both data were the same, this value would be 1. The real value was obtained by taking the precise values for the number of applicants and entrants to the Videogame Design and Programming degree course in the 2010, 2011 and 2012 academic years.

A summary table of some of the indicators for each dimension and factor is shown below.

Dimension	Professional education		
Factor	Teaching and learning		
Code	Description	Formula	Interpretation
FP002	Percentage of hours allocated to basic subjects over the total for all curriculum subjects.	% of basic subject hours = (total number of basic subject hours / total number of curriculum subject hours)* 100.	In the teaching-learning process, it allows the importance given to basic subjects, as compared to the total for all curriculum subjects, to be inferred.
FP003	Percentage of hours allocated to specialist subjects over the total for all curriculum subjects.	% of specialist subject hours = (total number of specialist subject hours / total number of curriculum subject hours)* 100.	In the teaching-learning process, it allows the importance given to specialist subjects, as compared to the total for all curriculum subjects, to be inferred.

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1. CEMED: Multimedia Distance Education Centre, part of the Academic Secretariat of the UNL, and the academic unit liaising with actors from the university community.

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| FP005 | Level of degree course virtualisation. | % of online subjects = (total number of online subjects / total number of curriculum subjects)* 100. | It allows a clear indicator of the level of degree course virtualisation to be obtained. For fully online degree courses, this indicator should always be 100% or thereabouts. |
| FP008 | Percentage of time spent on online activities. | % of time spent in the virtual classroom = ($\sum$(total number of hours per virtual classroom / total number of students) $_{academic\ year}$ / number of academic years))* 100. | It allows the average percentage of hours that students spend in online classrooms to be calculated. |

Dimension	Professional education		
Factor	Research		
Code	Description	Formula	Interpretation
FP020	Level of student participation in research projects.	% of students in research projects = $\sum$(total number of students in research projects / total number of students)* 100.	It allows the institution's commitment to research projects to be inferred.
FP022	Percentage of research activities fostered in virtual classrooms.	% of research activities = ($\sum$(total number of research activities / total number of activities per academic year) / number of academic years))* 100.	It allows activities that foster student research, in relation to the total activities in virtual classrooms, to be measured.

Dimension	Professional education		
Factor	Extension and social outreach		
Code	Description	Formula	Interpretation
FP030	Level of student participation in extension tasks.	% of students participating in extension projects = (number of students participating in extension projects / total number of students)* 100.	It allows the level of student participation in extension and social outreach tasks to be calculated.

Dimension	Professional education support		
Factor	Lecturers		
Code	Description	Formula	Interpretation
AFP001	% of full-time lecturers.	% of full-time lecturers = (number of full-time lecturers / number of lecturers)* 100.	It allows the percentage of full-time lecturers over total lecturers to be calculated.
AFP002	Number of tutors per degree course, in relation to the number of virtual classrooms.	Number of tutors per degree course = (number of tutors / total number of virtual classrooms) per academic year.	It allows the number of tutors, in relation to the number of virtual classrooms, to be calculated.

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Dimension	Professional education support		
Factor	Equipment, platform and infrastructure		
Code	Description	Formula	Interpretation
	% of virtual platform down time.	% of down time = (number of hours down / (24 * 7 * number of weeks academic year)* 100.	It allows the percentage of time that the virtual platform was down to be calculated.

Here we have not given an exhaustive list of all the indicators. Instead, we have presented the most representative ones for each dimension and factor, and those referring to specific aspects of distance education.

By creating a comprehensive quality assessment model that contains indicators for online education as well as indicators that allow us to quantify the general aspects of any higher education institution, we aim to facilitate a process of improvement that fosters those institutions' continuing adaptation to the objectives that they set.

Validation of the quality assessment model for distance education

In order to validate the quality model that we are creating, we have started operational development work on the design by identifying and selecting every constituent element or variable of the chosen model.

In this process, we have based our decisions mainly on:

- Publications on distance higher education, specifically those referring to quality, assessment, indicators, etc.
- Information obtained directly from the various accreditation models for face-to-face and online degree courses.
- Analyses of official documents and of public documents produced by distance education institutions, managers of distance education departments and others.

The proposed validation procedure, which is carried out continuously, seeks to ensure that each indicator created for each dimension and factor is unique, relevant and pertinent.

The validation process is continuous and iterative; it enhances the research and consolidates it too. That is why, as the indicators for each factor and dimension are generated, they are subjected to processes of expert consultation and studies of uniqueness, relevance and pertinence. When formula values for certain indicators are already known or can be obtained, those values are generated for the required periods. This enables triple validation, which is recommended in the literature reviewed: external validation given by expert opinion, and internal validation gained from studying the values obtained and from the fulfilment of the desired characteristics.

Conclusions

Creating a suitable model for distance education is a complex task that must take into account many specific variables of online learning. Consequently, we have begun to develop a quality assessment model that covers all the dimensions involved in higher education institutions: academic professional education, institutional and administrative management, and professional education support.

Indicators for each dimension were proposed in order to illustrate what needs to be assessed. The application of these indicators depends on the data captured and managed by the institutions and on the reality of each of them.

In the model, the assessment indicators are amalgamated and sorted into six major groups: functionality, effectiveness, efficiency, availability, information and innovation. This classification is comprehensive because it not only takes into account the classic groups, but also considers new groups that respond to the particular characteristics of distance education, which, at the time of writing the article, had not been contemplated by assessment models that were either traditional or commonly used by the educational community.

In addition, for each indicator, a unique identifier was generated, a formula was developed to calculate it, and the frequency with which it should be measured was defined, thus enabling a clear, up-to-date overview of the institution's situation to be had. The optimal and minimum desired values were proposed for each of the indicators, in accordance with institution's management and objectives, taking into account the accreditation standards of similar degree courses.

A quality assessment model that integrates and contemplates specific aspects of the distance education mode is therefore being developed. The results obtained from its application will facilitate higher education institutions' continuing improvement and optimise their strategic decisions as a whole, the aim of which is to make improvements in their educational processes.

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