Quality Management in Virtual Education

Management Indicators for Continuous Improvement

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Abstract: The important mission of the university institution in society as a body creating and transmitting knowledge justifies higher education being one of the main players in the application of new information and communications technologies (ICTs) in an attempt to exploit the significant advantages that their development can bring to the activity. However, the virtual university faces the challenge of analyzing how the new educational format alters the knowledge learnt in quality management in traditional higher education. New parameters, models and indicators will have to be defined, and new competitive bases will have to be promoted.

Key words: Total quality management, virtual higher education, student satisfaction.

1 INTRODUCTION

ICTs represent a unique opportunity for the management and creation of knowledge. In effect, the Internet is a super-highway giving access to all types of information, encouraging interactive communications at a world level, reinforcing and boosting understanding, comprehension and knowledge and so contributing to raising world quality at all levels.

From that basic premise, learning has also been subject to this phenomenon. It is obvious that the university, as an institution creating and spreading knowledge, grasps this opportunity to strengthen its role. To that end, it is experiencing and incorporating ICTs, especially the Internet, in its teaching and research work, taking advantage of the flexibility, dynamism and interactivity of the medium to promote communication between educational agents, both inside and outside the institution (Sánchez Allende, García Manso and Díaz Moreno, 2003).

However, *virtual learning in higher education defines a more competitive market* since the wider offer contributes to the virtual student being a demanding customer classified as a consumer requiring a university product and service of excellent quality. As a result, this leads to the need to study quality management within virtual universities. The academic literature shows this question (Pond, 2001; Roffe, 2002).

2   TOTAL QUALITY MANAGEMENT IN THE VIRTUAL UNIVERSITY: A PROGRAM FOR RESEARCH

Total quality management can be defined as a management philosophy that bases its raison d'être on customer satisfaction as a winning formula to achieve a competitive advantage in the market, involving all the organization and external agents such as suppliers and distributors, among others. The practicality of this model is that it is a multi-company management philosophy; in other words, applicable to any sector, and so, on asking whether TQM has a role to play in virtual university education, the answer is, of course it has.

Firstly, the virtual university is still an institution with a management directed at accomplishing its organizational mission – the creation and transmission of knowledge – which is performed in a digital context with its own characteristics. Secondly, the main client, the student, is more demanding than ever as a result of fierce competition in the market. Consequently, the student takes on a determining role as the key auditor of the academic institution's actions and is demanding not only in terms of quantity but also of quality because of the change in the nature of the service.

With reference to the need and formula for, and the implications of identifying the customer's requirements and demands, a review of the academic and professional literature revealed a series of basic premises. First of all, quality from the customers' perspective is defined as the difference between their expectations and their perceptions of the actions of the company under study. Secondly, quality is a multi-attribute concept; a construct of the second order resulting from the practice of the company in a set of areas of action, dimensions and attributes (Parasuraman, Zeithaml and Berry, 1985, 1988). In this respect, although some authors support the universality of one set of dimensions and attributes for every type of service (Parasuraman, Zeithaml y Berry, 1988), others support scales adapted to the specific context of the study, justified, in part, by the very idiosyncrasy of the field of study (Carman, 1990; Babakus and Boller, 1992). In this respect,

the differential nature of virtual education indicates the identification of the typical attributes and dimensions (Table 1).

Table 1. Characteristics of the virtual learning environment

QUALITY	CONCEPT
DYNAMIC	Up-to-date knowledge is transmitted in real time. The content and material are subjected to recycling and innovation as changes take place. It is impossible to be in the digital context and not take advantage of the sources of information provided by the Internet to capture and process information relevant to the content of the educational program.
INTERACTIVE	Students are in touch with teachers, other students, with the on-line resources of the Internet and with the institution's services. This is possible from the moment that the Net allows the user 24-hour access to the website, promoting interactive communication, which increases the added value of the educational offer.
PERSONALIZED	The student perceives a more personalized relationship insofar as there are methods and systems that permit direct, individual dealings with the teaching staff, other students and the institution itself. Moreover, as a result of the interactivity, the institution is on a direct line with each student, gathering information that enables it to identify possible interesting alternatives, adopting and adapting individualized formats.
COLLABORATIVE	The Internet favors collaboration, the exchange of ideas and discussion by providing the means and the systems, (chats, video-conferences, forums, debates...) to channel them. With collaborative work, the student will acquire skills such as the ability to criticize and work in a team, among others. In this way, constructive knowledge is generated, stemming from sharing it.
SELF-LEARNING	The student is more active in asking questions and obtaining help in virtual learning. He/she assumes more responsibility for his/her learning by having to seek information, show an initiative to work in a team and identify his/her own resources. The student can decide when and how to progress with his/her educational project, once again revealing the status quo of the Internet user: self-service and self-control.

At this point, and based, on the one hand, on the acceptance of customer satisfaction as the reference point for the internal management of the virtual university, and on the other, on the recognition of the properties of on-line education, this work addresses two basic objectives: (1) the theoretical proposal of a scale to measure quality in the university from the student perspective and, (2) the identification of the competitive bases of the internal management of the on-line educational institution that contributes to customer satisfaction.

To that end, it was decided to use a complementary methodology. Firstly, there was a review of the theoretical and practical works on success factors in virtual education in the academic literature and an examination of virtual education websites in order to construct the scale of quality. Secondly, based

on the gap model of Parasuraman, Zeithaml and Berry (1985), and after a study of the literature related to the resources and capabilities necessary to operationalize a virtual university, the criteria of internal management were linked to the evaluative criteria of the student.

The works reviewed included the contributions of Lieblein (2000), Sánchez Allende, García Manso and Díaz Moreno (2003), Tascón Trujillo (2003), as well as the empirical research of McGorry (2002) and Song et *al.* (2004).

3   PARAMETERS OF ACTION IN VIRTUAL HIGHER EDUCTION: AREAS OF ACTION AND COMPETITIVE BASES

Given the idiosyncrasy of higher education in the digital context, there is an analysis to identify the criteria to evaluate organizational excellence from the student perspective, and the factors of its internal management that contribute to student satisfaction.

3.1   Attributes and Dimensions of Quality in Virtual Higher Education

A review of the relevant academic and professional literature and an examination of websites devoted to on-line university education led to the extraction of a model that presents quality as a higher order construct comprising a set of dimensions – institutional quality, functional quality and relational quality – and sub-dimensions with their respective explanatory attributes.

As well as serving as a reference for organizational action, it offers the added value of explaining what each section –dimension and sub-dimension- contributes to and subsequently attracts the client.

3.1.1   Institutional quality as the fundamental core

Institutional quality affects the actions of the on-line educational institution regarding its making its activity known, projecting an image to the market and seeking a competitive position.

It represents the basic management nucleus from which every organizational action materializes since it refers to the disposition to offer determined academic products and services as well as those that are non-academic but relevant to an educational activity; it materializes in the image and the offer (Table 2).

Table 2. Institutional quality

SUB-DIMENSIONS AND OBJECTIVES	ATTRIBUTES
IMAGE	The student can access the administration and secretariat services to handle procedures and formalities.
Inform the institution's main client, i.e. the student.	The student has alternative, effective means of access to the institution's representatives.
Create a market image. Transmit security and responsibility to the student. Advertise the academic products and services.	The institution gives relevant information about the organization, such as its history, credentials and activity performed, resources, study programs, academic and financial results of previous years, services, and faculty staff.
Convince the student of the institutional capacity to undertake an e-learning project	The institution takes responsibility for protecting student data on the Internet and authors' copyrights.
	The institution programs visits to the campus, making university life more tangible.
	The institution has a digital platform that allows it to perform its administrative, academic and social work in an optimum manner.
OFFER	The educational offer is of social interest, meeting the needs of the job market.
Supply a flexible offer adapted to the students' limitations regarding time and location.	There is a wide range of study plans and vocational activities.
Deal with the economic, social and cultural areas demanded by professionals and that arouse interest in learning.	The student is offered up-to-date, interesting offers such as: job offers, research groups, masters and specialized courses.
	The student is offered access to, and participation and collaboration with, other universities.
Exploit the resources that other institutions can provide.	The student is offered access to, and participation and collaboration with companies and institutions.
Create and transmit knowledge.	

3.1.2 Functional quality as a means to channel the activity

Functional quality evaluates the execution of the on-line educational activity; the form and method that brings institutional quality into effect is operationalized. Therefore, in this dimension, we assess the institution's fulfillment of its raison d'être. Three sub-dimensions are used for this: design, material and teaching (Table 3).

Table 3. Functional quality

SUB-DIMENSIONS AND OBJECTIVES	ATTRIBUTES
DESIGN	The website design is attractive, entertaining, thus encouraging navigation.
Guide the student.	Navigation is simple and intuitive.
Avoid confusion and transmit security.	The operating technique is correct.
	The page download is relatively quick.

SUB-DIMENSIONS AND OBJECTIVES	ATTRIBUTES
Take the student where he/she needs to go.	
Save students' time.	
MATERIAL	The learning material is relevant and up-to-date, showing the important activities and facts.
Offer material that arouses student interest.	The design of the material is suitable for a virtual learning context, for example, using a hypertext format with links
Offer material that reflects international economic and social life.	to documents of interest. The teaching material is completed with access to documents, reports and experiences of other institutions
Avoid unnecessary inconvenience to the student when he is allowed access to the material at a suitable time and in an adequate form.	and companies. A virtual library of great bibliographical depth is available, permitting access to the documentation necessary for optimum performance of the learning task. Before the beginning of the course, the student has material that can still have points of interest updated. The teaching material is legible. It has easy understanding.
TEACHING	The teacher shows a clear mastery of the material, both in terms of the content and in responding to the student's
The student feels secure and comfortable.	queries and questions. The teacher conveys secure and trust.
The student feels that	The teacher accepts criticisms.
personalized teaching assistance is available.	The teacher stimulates collaborative learning. The teacher stimulates teamwork.
The student feels motivated.	The teacher encourages constructive argument.
The student integrates the content with technology in a natural way.	The teacher encourages debate by, for example, introducing topics related to the subject in chats, forums
Promote constructive, discussible, conciliatory thinking.	or video-conferences. The teacher motivates the student's interest and boosts learning.
	The teacher adapts the syllabus to reality by incorporating current topics into the program.

3.1.3   Relational quality as a vehicle to promote loyalty

Relational quality is the third level of organizational action to be evaluated. Although it could be included as part of functional quality because it operationalizes university life, its identification has been considered individually for one basic reason: it comprises the essence of the new information and communications technologies, which is personalization and interactivity.

In other words, the personalization and the interactivity are the subdimensions of the relational quality. The personalization adapts the academic offer to individual demands and the interactivity helps to do it.

The result of this philosophy is an attempt to create a virtual climate that favors the retention of the student as a customer that always finds a learning opportunity in the institution's offer, which is developed through personalization and interactivity (Table 4).

Table 4. Relational quality

SUB-DIMENSIONS AND OBJECTIVES	ATTRIBUTES
PERSONALIZATION Virtual teaching becomes a personal means of learning. Technology is the vehicle for an individualized approach to learning, not for automation. The student feels that the organization is making significant efforts to adapt to his/her personal demands and needs. The student feels that he/she is being appraised and guided in this new learning context.	The teacher guides and advises in both support material and study habits in order to achieve effective learning. The student has access to a technical assistance service that advises him/her in the use of ICTs. The teacher employs an individualized treatment of the student, monitoring and following up his/her progress. The teacher keeps the student informed of his/her academic progress (works, marks obtained, personal comments…) The student has access to his/her academic records as well as to information regarding his/her administrative paperwork. Flexible teaching methods are used so that the student can participate in line with his/her timetable restrictions. The student is permitted to configure the program, appraisal system and activities to suit his/her restrictions and needs. The student is informed, at the suitable time and in a correct form, of relevant topics of interest throughout the academic year.
INTERACTIVITY Maximize the principal characteristic of the new technologies: the possibility of interacting without problems of space and time. Create an atmosphere of a virtual campus, of collective social life. Encourage free expression, debate and communication. Facilitate access for everybody to everything.	Interactive communication between students (discussions, chats, video-conferences,..) is promoted, creating opinion groups and means of dialog. An informal space is created for communication among participants in the system, with the creation of a notice board, chats,..). Interactive communication between teachers and students is promoted (discussion forums, video-conferences,..).

3.2   COMPETITIVE BASES OF THE VIRTUAL UNIVERSITY FROM THE GAP MODEL

The Gap model, developed by Parasuraman, Zeithaml and Berry (1985) for physical environments and later modified by Zeithaml, Parasuraman and Malhotra (2000, 2002) for virtual environments, defines the quality

perceived by the user as the result of the size and direction of four organizational discrepancies or gaps associated with information, design, operations and communication: (a) Gap 1, the information gap, is the difference between the users' expectations and the managers' perceptions of the users' expectations (b) Gap 2, the design gap, is the difference between the managers' perceptions of the users' expectations and the specifications of quality established in the design, (c) Gap 3, the operations gap, is the difference between the design specifications and the service actually provided; and, (d) Gap 4, the communication gap, is the difference between the service provided and that which is communicated to the users.

In this way, the quality perceived by the user, also called Gap 5, is the result of the difference between the service provided and the expectations and is the accumulated effect of the four previous gaps. This means that the gap model would combine the following parts in a common framework: (1) evaluation of e-quality and its consequences (the user part) and (2) the organizational deficiencies that could reduce e-quality (the organization part).

Once the customer perspective is analyzed and taking this model as a reference, its use in the case of the virtual university lies in extracting the key aspects in the internal management in order to achieve optimum action in the evaluative criteria that the student takes a reference.

These key aspects give a detailed description of the competitive bases that a virtual university must control (Table 5).

Table 5. Competitive bases of virtual university management

CAUSES OF THE GAPS	STRATEGIES TO NARROW THE GAPS: COMPETITIVE BASES
GAP 1 Insufficient market research. Inadequate use of the research. Lack of interaction between managers and users. Inadequate upward vertical communication.	Study the level of student satisfaction (e-mail surveys, analysis of complaints and suggestions,...). Study the level of expectations and demands of novel students. To promote interaction between management and students there must be forms of access (e-mail, telephone, fax,...), as well as virtual encounters via video-conferences. The institution's top management must increase meetings and communication with teaching and administrative staff to obtain proposals and suggestions.
GAP 2 Deficiencies in the commitment of the management. Perception of non-viability. Absence of objectives or errors in the establishment of requirements or standards.	The university management must be trained in quality management. The university management must believe in Total Quality Management. The university management must know their resources. The university management must value their resources. The university management must pursue and procure resources from others organizations. The university representatives must define their areas of

CAUSES OF THE GAPS	STRATEGIES TO NARROW THE GAPS: COMPETITIVE BASES
	action (such as: teaching, administrative services, virtual services like the library, notes/handouts on the net, links with other organizations). The university representatives must establish objectives or standards in each area of action that are coherent with strategy.
GAP 3 Functional ambiguity and conflicts. The staff members do not really know the scope of their functions. The technology required to perform the operations is not in place. Inadequate systems of supervision, control and reward. Lack of a sense of teamwork.	Clear delimitation of the programs of subjects, with discrimination of content. The organization's members must know the scope of their functions (of content and technologies). The remuneration of the teaching staff must be linked to productivity (for example, according to the number of video-conferences offered, or the number of on-line tutorials). The virtual university must have a complex, interactive digital platform. Teamwork facilitates the optimum result by means of, for example, the saving of resources and the synergies of technological learning.
GAP 4 Deficiencies in lateral communication between departments and sections. Differences in procedures and policies of the different areas. Tendency to promise too much.	All the university staff must know and agree on the marketing plan. A series of minimum criteria for teaching must be established (for example, interactivity and personalization in dealing with the student). Continuous improvement must be reinforced in order to reach higher levels of action; only then can high promises be made.

4   CONCLUSION

There are two lessons to be learnt by reading this work. Student satisfaction with the virtual university requires optimum action from the institution in three areas: institutional quality (image and offer), functional quality (design, material and teaching) and relational quality (personalization and interactivity). To meet those demands, the university must strengthen a set of competitive bases, including the following: collaboration, training, participation of management, participation of teaching and administration, continuous improvement, information, alliances with strategic partners such as other universities or companies for projects or exchanges. However, the combination of TQM and virtual higher education constitutes an important area of study. In this respect, it is necessary to perform future analyses of aspects such as the application of the EFQM, certification and accreditation subject to the norms, and how strategic alliances contribute to excellence.

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