ARTICLE

Dimensions of Perceived Service Quality in Higher Education Virtual Learning Environments

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Abstract

Virtual learning environments (VLEs) make intensive use of information and communication technologies (ICTs) to underpin the delivery of basic higher education institution functions (teaching, administrative procedures, materials distribution, etc.), and are a characteristic feature of today's educational context. The spread of e-learning and of competence in this field has given rise to growing concerns about the quality of this service. It is therefore vital to develop systems, models and scales that allow institutions to obtain valid, reliable and consistent measurements of the quality of educational services provided by means of VLEs. That is the basic aim of the work described in this article. Taking the literature on perceived service quality (PSQ) as its point of reference, and also a holistic approach to educational services, it presents a scale model that allows PSQ in such environments to be measured. The scale is formed by 24 items grouped into four dimensions: core business (teaching), facilitative or administrative services, support services and user interface.

Keywords

virtual learning environments; perceived service quality; quality dimensions; students; e-learning; management, universities

Las dimensiones de la calidad del servicio percibida en entornos virtuales de formación superior

Resumen

La aparición de entornos virtuales de aprendizaje (EVA) caracterizados por el uso de las tecnologías de la información y la comunicación (TIC) en las diversas funciones institucionales básicas de la educación superior (docencia, procesos administrativos, desarrollo y distribución de materiales, etc.) constituye un elemento característico del contexto educativo actual. La expansión del aprendizaje virtual (e-learning) y la competencia en este ámbito han hecho que aparezca una creciente preocupación por la calidad de este servicio. En este sentido resulta necesario desarrollar sistemas, modelos y escalas que permitan obtener medidas válidas, fiables y consistentes de la calidad de los servicios educativos que se ofrecen en EVA. Este es el objetivo básico del presente trabajo, que toma como punto referencia la literatura sobre calidad del servicio percibida (CSP), y adoptando una perspectiva holística de los servicios formativos se presenta una escala modelo que permite medir la CSP en dichos entornos. Esta escala está compuesta por 24 ítems que se subsumen en cuatro dimensiones: servicio esencial (docencia), servicios facilitadores o administrativos, servicios de apoyo e interfaz del usuario.

Palabras clave

entornos virtuales de aprendizaje; calidad de servicio percibida; dimensiones de la calidad; estudiantes; e-learning*; gestión; universidad*

1. Introduction

Today's context of higher of education is one of change, with new educational needs to meet the demands of the knowledge society, ever-growing numbers of universities, budget cutbacks, and information and communication technologies (ICTs) offering new opportunities for face-to-face and distance service provision. This context forces universities to re-examine their structures, strategies and processes, and, in particular, to adopt competitive strategies that allow them to differentiate their offerings on the basis of higher levels of quality (DeShields et al., 2005). More attention is now being paid to perceived service quality (PSQ) from the university students' perspective (O'Neill & Palmer, 2004; Stodnick & Rogers, 2008). This encompasses diverse yet related issues such as determining the dimensions that form part of the PSQ construct, designing the quality management model and dealing with the issues arising from its implementation.

However, in order to articulate this strategy, it is essential not only to ascertain the types of attribute that students take into account when assessing quality, but also to determine their relative importance (Nath & Zheng, 2004). So the need for assessment and conceptualisation is critical to e-services because of their intangible and impersonal nature on the one hand, and the difficulty in defining tangible indicators on the other (Zeithaml et al., 2002).

Moreover, a view held by many authors on the subject is that traditional PSQ models cannot be applied automatically to virtual environments, mainly because their features are very different (Cox & Dale, 2001). Usually, PSQ measurement scale items are connected with the personal interaction that takes place in traditional services (Bitner, 1990). In the absence or lack of physical interaction, the dimensions are assessed under different criteria (Long & McMellon, 2004; Ward et al., 2010) and therefore need "to be reformulated before they can be meaningfully used in an e-service context" (Riel et al., 2001, p. 363). However, there is very little literature on perceived e-service quality (PeSQ) (Sureschandar et al., 2001; Zeithaml & Bitner, 2003; Parasuraman et al., 2005). So "an important research priority is to examine the scales in the context of pure-service sites" (Parasuraman & Grewal, 2000, pp. 214 and 229).

As an extension to existing works on offline higher education (O'Neill & Palmer, 2004; Joseph et al., 2005; Marzo-Navarro et al., 2005; Palmer & Holt, 2009), this work takes a holistic approach that does not focus exclusively on the assessment of teaching. Rather, it includes auxiliary university services that form part of a student's overall experience. It is about analysing the dimensions that have an impact on online students' perceptions of university service quality.

2. Assessment of perceived service quality in virtual learning environments

The use of the term *quality* in higher education was quite unusual until relatively recently (DeShields et al., 2005). The reluctance to use it bears some relation to the inside-out perspective (Joseph et al., 2005), meaning that the approach to quality has been based on the assumption that university

managers are capable of developing programmes that can satisfy students. However, the literature on quality points to the opposite, suggesting that users' needs are the relevant issue. So, ascertaining what these needs are is the first and fundamental step of the process, since it is crucial to have prior knowledge of what is expected (Zeithaml et al., 2002). On the other hand, many PSQ initiatives are weighed down by too much emphasis on the technical dimensions or aspects of quality, such as academic performance and research activity, to the detriment of functional aspects that are more related to PSQ and satisfaction. Indeed, such aspects can be used to create a competitive advantage (O'Neill & Palmer, 2004; Udo et al., 2011).

A review of the literature on the assessment of PSQ in face-to-face education revealed that many approaches were inspired by *SERVQUAL,*[1] *SERVPERF*[2] *or own item scales centred on the assessment of teaching quality. However, the service provided in a virtual learning environment (VLE) has two particular characteristics: it is pure*[3] *because it does not take the form of a one-off transaction (it requires prolonged interaction over a period of time) and complex because it includes teaching and supplementary services. Given these characteristics, most of the research on e-services, which focuses on the analysis of websites and e-commerce, cannot be applied to the service provided in a VLE. The scarcity of studies on this topic is therefore worthy of note (Table 1).*

The analysis shows that O'Neill and Palmer (2003), and Udo et al. (2011) applied a methodology that was specific to PSQ assessment in higher education VLEs, albeit limited to a particular university service (a library) and to e-learning on a degree course, respectively. The other works are of an exploratory nature (they used their own scales, analysed the level of satisfaction with specific services and/or did not allow the dimensions of the construct to be identified). That is why their conclusions are not comparable to those obtained in similar studies of face-to-face learning (De Lange et al., 2003; Ehlers, 2004).

Taking the limitations of these studies as the starting point, the aim of this work is to get an understanding of the students' overall experience of the service, which includes all of the teaching and non-teaching services offered, and to capture the particular features of VLEs. The reason for doing so is that it is likely, in the presence of these particular features, that students will assess PSQ differently from the way they do so in face-to-face learning (Long & McMellon, 2004; Garza, 2010).

3. Empirical analysis: method and results

This section describes the research process that was followed to identify, rigorously and reliably, the dimensions and attributes that have an impact on online students' perceptions of university service quality. Section 4 discusses the content of these dimensions and their implications for management.

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1. A scale based on a disconfirmatory paradigm (Parasuraman et al., 1988), where PSQ depends on the extent to which a service provision meets a customer's expectations.
2. A scale that considers the PSQ construct as a variable, which exclusively depends on customers' perceptions of a service outcome, without the surveyed individuals' prior expectations being relevant.
3. As such it is *intangible*, as production is *inseparable* from consumption, requiring a student's active intervention in the service provision; *heterogeneous*, as it is personalised by each individual's behaviour; and *perishable*, as it cannot be stored.

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Table 1. PSQ in online higher education

Authors	Concept studied	Model	Qualitative analysis	Quantitative analysis	No of scale attributes	Response scale	Data analysis	Results: No of dimensions and explanatory power
O'Neill et al. (2003)	Service quality in an online university library	Adaptation of SERVQUAL SERVPERF	3 group interviews	269 useful student quest.	18	5-point Likert	PCFA*	SERVQUAL (59.55%) 3 dimensions (contact, tangibles, reliability) SERVPERF (59.3%) 4 dimensions (contact, responsiveness, reliability, tangibles)
De Lange et al. (2003)	Teaching quality in a VLE	Own scale	25 students	292 useful quest.	7	5-point Likert	PCFA*	4 factors (usefulness and availability of teaching resources, bulletin board, online assessment and others)
LaBay & Comm (2003)	Teaching quality in e-learning	Own scale	None	University students (no n/k)	12	5-point Likert	None	Not defined
Greasley et al. (2004)	Student experiences of a VLE	Own scale	None	420 useful quest.	18	5-point Likert	None	Not defined
Ehlers (2004)	Service quality in e-learning	Own scale	56 student interviews	1,994 quest.	153	Not specified	Cluster analysis and PCFA*	30 dimensions
Udo et al. (2011)	Student experiences of e-learning	SERVQUAL	None	203 students		Not specified	Structural equation model	4 dimensions (responsiveness, reliability, website content, empathy and courtesy)

* Principal component factor analysis
Source: Own elaboration.

The empirical analysis has two main stages: the first is qualitative and constitutes a preliminary step for the proper development of the second, which is the subsequent quantitative study.

3.1. Preliminary qualitative analysis and study population

The process of designing the scale or questionnaire began with a preliminary qualitative analysis, the defined purpose of which was to identify, using the critical incident technique[4] (Chell, 1998), those aspects of the service that were relevant and important to online students (Phelan, 2012). Using

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4. Each student was asked to give between five and ten positive examples, and the same number of negative examples of specific personal experiences connected with the service provided by the university (Hayes, 1999). Some of the examples given for the learning schedule attribute were: positive, "Right from the start, I know exactly what the schedule for the whole course is, so there are no last minute surprises"; negative, "the course schedule was sometimes changed or not adhered to […]".

this method, 41 students from the Open University of Catalonia (UOC) took part in the study. They reported a total of 350 valid critical incidents that were classified into 12 dimensions,[5] encompassing a total of 33 definitions (Martínez-Argüelles et al., 2010).

Bearing in mind the attributes generated in this qualitative analysis process, and taking the *e-SERVQUAL* scale structure (Parasuraman et al., 2005; Zeithaml et al., 2002) as the benchmark, a questionnaire containing 33 items was designed. A questionnaire pre-test was conducted and, after making the necessary adjustments, a final total of 30 items was obtained. These were the ones contained in the questionnaire sent by e-mail to the personal e-mail addresses of the students enrolled on the UOC's undergraduate programmes (25,223). From this total number of students, 1,870 valid responses were received, representing a sample error of 2.18%. In addition, it was found that the characteristics of the students whose opinions were ultimately taken into account in the study did not substantially differ from those of the study population. Moreover, there were no significant biases arising from exclusively considering those students who had decided to fill in the questionnaire voluntarily, contrasting the absence of significant differences between the earliest and the latest responses (Amstrong & Overton, 1977).

3.2. Quantitative analysis

In order to determine the dimensions of PSQ in online higher education, a factor analysis was performed, initially exploratory and subsequently confirmatory.

3.2.1. Factor analysis

After ensuring that the sample data were suitable for an exploratory factor analysis to be performed, the principal component with orthogonal rotation method was applied. This analysis highlighted four factors (see Table 3) that subsume 24 attributes of the scale initially designed, which explain 60.3% of the variance. In order to validate the result obtained, a confirmatory factor analysis was performed by means of the structural equation model (Hair et al., 2004).

In order to study the proposed model's goodness of fit, a three-level assessment was performed: (1) test of overall model fit (absolute, incremental and parsimonious), (2) test of measurement model, and (3) test of structural model fit (Barrio & Luque, 2000).

The model fit measurement analysis in Table 2, using various indices that are generally analysed in such cases (Barrio & Luque, 2000), allowed a better fit of the four-factor overall model to be confirmed.

As shown in Table 3 below, the statistical significance and reliability of each indicator, as well as the composite reliability and the variance extracted from each dimension, were at acceptable levels (Hair et al., 2004), thus allowing a good fit of the measurement model to be confirmed.

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5. These dimensions were connected with the design and the focus of the programme, the didactic materials and resources, the development of learning, its evaluation, the staff's speed in responding (teaching, administrative and information technology [IT] staff), the appropriateness of the response, the staff's friendliness and accessibility, the simplicity of administrative procedures, the physical delivery of documentation, relationships with fellow students, the user interface, and the costs and benefits.

Table 2. Model fit measurements

Overall model fit measurements		Model 0 (M0) One-dimensional	Model 1 (M1) Four correlated factors
Absolute	χ²(g.l.) (p)	5,441.583 (252) (0.000)	1,663.289 (244) (0.000)
	NCP	5,189.583	1,419.289
	GFI	0.713	0.907
	RMR	0.068	0.042
	RMSEA	0.118	0.063
	ECVI	3.721	1.193
Incremental	AGFI	0.658	0.885
	TLI	0.685	0.911
	NFI	0.703	0.909
	CFI	0.712	0.921
Parsimonious	PNFI	0.642	0.804
	PGFI	0.599	0.738
	AIC	5,537.583	1,775.289
	BIC	5,792.265	2,072.417
	CAIC	5,840.265	2,128.417

The structural model fit was also satisfactory, as all the regressions of the items in relation to their latent variables, as well as the rest of the relationships established in the structural model, were significant (Table 3).

3.2.2. Reliability, validity and explanatory power of the scale

Once the scale had been obtained, formed by 24 items grouped into four dimensions, their reliability and validity were confirmed by means of different analyses.

Reliability

In the exploratory factor analysis and by means of Cronbach's alpha, it was found that the scale as a whole (0.93) and each of the dimensions were internally consistent. This conclusion was subsequently corroborated in the confirmatory analysis, as all of the items' factor loads in relation to their latent variables were significant, and the composite reliability of each factor was higher than 0.70 en every case (Hair et al., 2004).

Validity

Content, construct and predictive validity were assessed.

Table 3. Standardised weights, t value, composite reliability and variance extracted

Factor	Indicators and attributes	Stand. weight	t*	Comp. reliab.	Variance extract.
Factor_1	Teaching competencies	0.769	25.913	0.902	0.480
	Activity feedback	0.727	24.739		
	Teaching problem-solving	0.723	24.621		
	Activity contribution	0.706	24.082		
	Programme design	0.699	23.914		
	Didactic materials and resources	0.685	23.500		
	Student guidance	0.669	23.008		
	Assessment consistency	0.662	–**		
	Tutor friendliness	0.648	22.549		
	Assessment system	0.635	30.189		
Factor_2	Administrative problem-solving	0.809	25.388	0.864	0.517
	Ease of making complaints	0.761	24.719		
	IT problem-solving	0.730	24.660		
	Administrative procedure simplicity	0.653	20.432		
	Administrative staff friendliness	0.651	20.794		
	Administrative deadline fulfilment	0.646	–**		
Factor_3	Supplementary services	0.779	–**	0.809	0.516
	Synchronous activities	0.760	27.467		
	Face-to-face activities	0.712	25.857		
	Interaction among students	0.613	22.243		
Factor_4	Navigation speed	0.807	28.403	0.831	0.554
	Connectivity	0.769	27.330		
	Robustness	0.741	–**		
	Navigability	0.650	23.296		

* All the estimations were significant ($\alpha = 0.001$).

** Value not calculated (the parameter was set at 1 to establish the scale of the latent variable).

(a) Attempts were made to ensure content validity by means of an exhaustive review of the literature, the qualitative analysis performed before defining the questionnaire, and the inclusion of an open question in the survey. In answer to the open question, comments were made that did not contain any new attributes, though they did contain more detailed assessments of aspects already considered. This was another piece of evidence that helped to corroborate the questionnaire's validity (Capelleras & Veciana, 2001).

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(b) Assessing construct validity involved comparing its convergent, discriminant and nomological validity.

(1) Convergent validity was confirmed by means of an analysis of variance (ANOVA), considering the PSQ level as a *factor*. In relation to the scale as a whole and to each factor, the differences between the means for each overall quality group were significant, both generally (Welch and Brown-Forsythe's F test) and in pairwise and inter-group multiple comparisons (Games-Howell test). In addition, a significant positive relationship was found between each factor and the overall quality group variable[6] (Capelleras & Veciana, 2001).

Table 4. ANOVA of overall quality groups

Factor	Variation	Sum of squares	g.l.	Mean square	F	Sign.
Factor_1	Inter-group	301.836	2	150.918	698.094	0.000
	Intra-group	403.618	1,867	0.216		
	Total	705.454	1,869			
Factor_2	Inter-group	289.652	2	144.826	370.747	0.000
	Intra-group	729.313	1,867	0.391		
	Total	1,018.965	1,869			
Factor_3	Inter-group	229.357	2	114.679	206.457	0.000
	Intra-group	1,029.267	1,853	0.555		
	Total	1,258.625	1,855			
Factor_4	Inter-group	207.017	2	103.508	293.893	0.000
	Intra-group	657.553	1,867	0.352		
	Total	864.570	1,869			
Factor_T	Inter-group	271.156	2	135.578	765.187	0.000
	Intra-group	330.800	1,867	0.177		
	Total	601.956	1,869			

* Difference between means was significant at the 0.05 level.

(2) The discriminant validity of the scale was confirmed, as the different items solely and exclusively formed part of one of the latent variables according to the confirmatory factor model. And by means of the Bonferroni test, the correlations between the different measured dimensions were found to be relatively weak.

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6. Therefore, a *very high* assessment of overall quality corresponds to a *very high* assessment of the scale as a whole and of each factor; a *high* assessment of overall quality corresponds to a *high* assessment of the scale as a whole and of each factor; and finally, a *low* assessment of overall quality corresponds to a *low* assessment of the scale as a whole and of each factor.

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Table 5. Bonferroni test

Model assumptions	No of param.	χ2	g.l.	P	Δ χ2	Δ g.l.	Stat. sign.*
Not restricted	53	1,481.427	223	0.000	–	–	–
Covar (F1-F2) = 1	52	1,861.427	224	0.000	380.000	1	***
Covar (F1-F3) = 1	52	1,670.850	224	0.000	189.423	1	***
Covar (F1-F4) = 1	52	1,968.397	224	0.000	486.970	1	***
Covar (F2-F3) = 1	52	2,006.646	224	0.000	525.219	1	***
Covar (F2-F4) = 1	52	2,306.311	224	0,000	824.884	1	***
Covar (F3-F4) = 1	52	2,088.983	224	0.000	607.556	1	***

* For $\alpha = 0.01$, the critical level was 13.905.

(3) In relation to nomological validity, ANOVA corroborated that the scale assessments were significantly different between students, with high, intermediate and low PSQ assessments. And the correlation between overall quality and the scale was positive and significant (0.680).

(c) Finally, the (concurrent) predictive validity of the scale was confirmed, as a positive and significant degree of Pearson correlation was obtained (0.68) between the scale and the PSQ variable (Capelleras & Veciana, 2001).

Explanatory power

In order to assess explanatory power, a multiple linear regression analysis was performed after verifying the fulfilment of the model's necessary validity conditions. As a result, it was found that the four identified dimensions had a significant and positive impact on the variable that had to be explained, that is to say, on PSQ. In addition, while the relative importance of the first factor to overall quality was almost 37%, the fourth factor represented just 17% (less than half of the first one), and the other two dimensions 24% and 22%, respectively. Finally, and assuming a linear relationship, it was found that the four-dimension scale had limited explanatory power of PSQ (corrected $r^2 = 0.501$)

Table 6. Partial regression coefficients

	Non-standard. coef.		Stand. coef.	t	Sig.	Confidence interval for beta at 95%		Correlations		
	Beta	Typical error	Beta			Lower limit	Upper limit	Zero-order	Partial	Semi-partial
(Cnt.)	4.037	0.012		343.557	0.000	4.014	4.060			
F₁	0.332	0.012	0.504	27.772	0.000	0.308	0.355	0.502	0.582	0.504
F₂	0.218	0.012	0.331	18.235	0.000	0.194	0.241	0.328	0.425	0.331
F₃	0.148	0.012	0.229	12.587	0.000	0.125	0.171	0.222	0.308	0.228
F₄	0.195	0.012	0.300	16.519	0.000	0.172	0.218	0.300	0.391	0.300

4. Discussion of results

According to the analysis, the students' perceptions of a VLE's service quality are a multi-dimensional construct formed by four factors. In line with the conclusions drawn by Grönroos (1984, 1990), Grönroos et al. (2000), Liljander et al. (2002) and Riel et al. (2001, 2004), we can call these:

(1) Dimension 1: core business: teaching.
(2) Dimension 2: facilitative or administrative services.
(3) Dimension 3: support services.
(4) Dimension 4: user interface.

(1) The core business is what, by convention, we have called *teaching*. This factor subsumes ten indicators. Of these, the one that makes the biggest contribution to determining the latent variable is the one pertaining to the tutors' knowledge, experience and pedagogical capacity, followed closely by the feedback that students get from tutors on activities that students carry out, and thirdly, by the speed and efficiency of teaching-related query-solving. Then, in order of importance, come the contribution to learning of the activities carried out throughout the course (practicals, assignments, exercises, debates, etc.); the structure, objectives and characteristics of the programme; and the format and content of didactic materials and resources. Finally, the remaining indicators are student guidance (e.g., providing study techniques, and academic and professional guidance); the assessment system's consistency with programme objectives and activities carried out throughout the course; the friendliness and courteousness of lecturers in their dealings with students; and the assessment system itself.

(2) The factor reflecting facilitative or auxiliary services comprises six variables that are basically connected with aspects of an 'administrative' nature. As Grönroos (1990) pointed out, these are auxiliary yet essential services for securing the core business. So, in order of impact, this factor is shaped by the following indicators: the speed and efficiency of solving administrative queries, incidents and problems (enrolment, delivery of documentation); the ease of communicating problems, complaints and queries (phone service, online assistance); the speed and efficiency of solving IT queries, incidents and problems (connection, viruses, etc.); the simplicity and clarity of administrative procedures (e.g., enrolment and dossier management); the friendliness and courteousness of the institution's administrative staff in their dealings with students; and finally, the fulfilment of administrative documentation delivery deadlines (certificates, degree certificates, etc.). Within this latent variable, the indicators that appear to have greater importance than the attributes inherent to the service (administrative procedure simplicity, administrative staff friendliness and administrative deadline fulfilment) are those pertaining to administrative and IT problem-solving, and the ease of making complaints or, in other words, what Zeithaml et al. (2002) and Parasuraman et al. (2005) call *responsiveness*.

(3) When referring to support or supplementary services, we mean those whose provision, albeit not compulsory, does differentiate an institution's educational offering. Four items are considered as such: supplementary services (job bank, internships in firms or institutions, extracurricular activities);

synchronous activities (such as videoconferences or chats); face-to-face activities (meetings, conferences, face-to-face tutorials, etc.); and finally, virtual spaces for student interaction such discussion forums and groups.

(4) Finally, there are four user interface indicators. Listed in order of relative importance, they are speed of navigation, of web-page loading, and of file uploads and downloads; the ability to connect to the campus quickly at all times; the robustness of the campus (whether it crashes when web pages are loading, or when files are being uploaded or downloaded); and finally, the simplicity and intuitiveness of campus navigation. Of these, the one that has the biggest impact is navigation speed, and the one that has the least impact is navigation simplicity and intuitiveness. Frequent use of the interface almost certainly has a kind of 'experience effect' that causes aspects pertaining to navigation speed, connectivity and robustness to acquire a prevalent importance over those pertaining to ease of use. This dimension corresponds to what some authors (Zeithaml et al., 2002; Parasuraman et al., 2005) call *reliability* or *system availability*, that is to say, to the technical operation of the website, meaning that it is always available and operating properly.

The structural dimension that we have just presented is similar to the one obtained in studies on PSQ conducted in other contexts by authors like Grönroos (1990), Grönroos et al. (2000), Liljander et al. (2002) and Riel et al. (2001, 2004). In addition, a higher degree of correlation was found between the first three dimensions —those representing what the institution offers— than between these and the fourth dimension pertaining to the user interface —representing the way or means by which the service is provided (Liljander et al., 2002). This is consistent with the well-known Grönroos model (1990), which postulates the existence of two basic types of quality dimension: technical quality, referring to the service outcome, that is to say, what the consumer actually receives, and functional quality as an expression of the service provision process itself.

5. Conclusions

Face-to-face and online students' perceptions of service quality have become a critical strategic aspect of differentiation in today's university system. Despite its importance, very few relevant theoretical contributions (Parasuraman et al., 2005) to the PSQ construct in VLEs have so far been made. This work partly fills that void. The four identified dimensions (core business, facilitative services, support services and user interface) are not analogous with those of the original *SERVQUAL* model (Parasuraman et al., 1988), though they are similar to those of other studies conducted in the field of e-services (Riel et al., 2001; 2004). These dimensions are, in essence, an extension of the Grönroos model (1990), because they can be grouped into two basic overarching dimensions: technical quality and functional quality, with the latter being especially adapted to the specific characteristics of virtual environments.

According to the research presented here, universities that operate online should bear in mind that, when it comes to assessing the quality of the e-service they provide, their students pay a great deal of attention to the teaching that a university offers. To be precise, students focus above all on

the lecturers' knowledge, experience and pedagogical capacity; on the quality of the feedback they get from tutors on activities they, the students, carry out; and on the speed and efficiency of having their queries solved. However, other dimensions of the university service also have a significant impact, albeit to a lesser extent, on students' perceptions of university service quality. The quality of administrative services and of the user interface affects user satisfaction. In this field, and perhaps more so because it is a virtual environment, attributes pertaining to responsiveness (Zeithaml et al., 2002; Parasuraman et al., 2005) are particularly relevant. Thus, aspects that have a significant impact on students' perceptions of service quality include administrative and IT problem-solving speed, the ease of making complaints, and VLE navigation and connection speed. Finally, students also take into account the quality of supplementary services (e.g., job bank, synchronous activities and face-to-face activities). Having identified these aspects, they should be duly managed to enable e-universities to secure and maintain a competitive advantage in the quality of their e-services.

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