

Quality perceived by online students: The influence of contextual factors

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Several studies (Gagliano and Hathcote, 1994; Zeithaml *et al.*, 2002; Dabholkar and Bagozzi, 2002) postulate that consumer characteristics of age, gender, income or education- provide significant differences in terms of expectations and perceptions of service quality. This study improves on prior research to present empirical validation of the differences in the level of perceived service quality (PSQ) among online higher education students depending on contextual factors, such as the students' sex and age, their higher education experience, their motivation or their academic performance. Additionally, it analyses the influence of the type and location of the connection used by the student, as well as the cost of the fees.

A multiple linear regression model was employed, in which each factor is considered individually, and its direct and indirect effect (through the dimensions of quality: essential service, support services, complementary services and user interface) on the perceived service quality is analysed. The data used in the analysis were obtained from a sample of 1,870 students with degree qualifications of the Open University of Catalonia (UOC).

Keywords Perceived service quality; Online higher education; Contextual factors

1. Introduction

Service quality in higher education has received increasing attention since the last decade of the 20th century. This attention covers a series of diverse but closely related questions: the determination of the dimensions that comprise the perceived service quality (PSQ) construct in higher education (Rowley, 1997) or the design of quality management systems or models (Owlia and Aspinwall, 1996), among others. Earlier research (Martínez, 2006) revealed four dimensions that have the capacity to partially and significantly explain the students' PSQ:

- a) the essential service, comprising teaching-related indicators, the most relevant of which are knowledge, experience and teaching capacity of the lecturers; the feedback obtained from the students on the activities they carry out; and the speed and efficacy in solving doubts related to the teaching.
- b) Support services, namely services that, although secondary are nonetheless indispensable for the rendering of essential services, as is the administration department.
- c) Complementary services that, although not being strictly obligatory, contribute to differentiating the service offer (labour pool, virtual spaces for student interaction, such as forums and discussion groups, etc).
- d) The user interface, which refers to aspects such as the navigation speed and the uploading and downloading of pages and files, the possibility of fast and permanent connections with the virtual campus and a simple and intuitive navigation.

Various studies, however, highlight that the PSQ and the explanatory capacity of each one of the dimensions is also contingent on a wide range of variables related to the psycho-social characteristics of the

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students and to the educational offer itself. The current work examines how the PSQ level varies in online higher education based on diverse contextual factors. Specifically, it seeks to provide answers to the following questions: Do the evaluations of service quality vary according to the personal characteristics of students? Do motivation and academic performance influence the level of perceived service quality? And what influence do other factors, such as the type and location of the Internet connection, the cost of the studies, or the programme's field of study, have?

2. Aim of the study

One of the distinctive features of online higher education is the presence of a technological interface that emphasises the need for the students not only to participate in, but also to be willing agents in the learning process (Semeijn *et al.* 2005). This provides an interesting opportunity to verify whether online higher students characteristics provide significant differences in terms of service quality perceptions, as observed in other service settings (Gagliano and Hathcote, 1994; Zeithaml *et al.*, 2002, Dabholkar and Bagozzi, 2002). With this objective in mind, we have formulated the following hypotheses:

Hypothesis H1: *The student's sex has a direct and indirect effect on the PSQ.*

Hypothesis H2: *The student's age has a direct and indirect effect on the PSQ.*

Hypothesis H3: *The student's experience of university education has a direct and indirect effect on the PSQ.*

Hypothesis H4: *The holding of a university degree has a direct and indirect effect on the PSQ.*

Hypothesis H5: *The student's experience in online education has a direct and indirect effect on the PSQ.*

Hypothesis H6: *The student's experience in the university institution itself has a direct and indirect effect on the PSQ.*

Hypothesis H7: *The student's motivation has a direct and indirect effect on the PSQ.*

Hypothesis H8: *The student's academic performance has a direct and indirect effect on the PSQ.*

Hypothesis H9: *The programme's field of study has a direct and indirect influence on the PSQ.*

While service quality perceptions in traditional (offline) environments are the result, in large part, of the service encounters between customers and service providers, the PSQ of online services is generally based on evaluations of the interaction between the user and the technological interface (van Riel *et al.*, 2004). For this reason, design and aesthetic considerations and service accessibility, mainly determined by elements such as the type and speed of the Internet connection, are key indicators of service quality (Dabholkar *et al.*, 1996; Kaynama and Black, 2000). In order to evaluate their effect on the PSQ level we have formulated Hypotheses H10 and H11:

Hypothesis H10: *The type of Internet connection that the student uses has a direct and indirect effect on the PSQ.*

Hypothesis H11: *The location of the student's connection has a direct and indirect effect on the PSQ.*

Many studies (Jarvenpaa and Todd, 1997; Voss *et al.*, 1998; Mittal *et al.*, 1998; Bolton and Lemon, 1999) found a significant relationship between price and perceived service quality. In the case of online services, consumers cannot examine in advance the services they are going to receive, nor can they infer their quality by referring to the physical installations or the appearance of the vendor staff (the so-called "servicescape"). So they tend "to use price as an indicator of the quality of the service" (Jiang and Rosenbloom, 2005, p. 156). Hence we propose to corroborate the following relation:

Hypothesis H12: *The price of the studies has a direct and indirect effect on the PSQ.*

3. - Methodology

A multiple regression analysis has been used to contrast each one of the hypotheses. In each case we have analysed whether the variables in question have a significant effect on the PSQ and, where the

answer is affirmative, the extent of their relative influence. To achieve this, we started out with a linear regression model comprising four initial dimensions and subsequently we gradually added the different qualitative and quantitative variables to this basic model. These variables were incorporated into the model with both additive and multiplicative effect, the latter in relation to each one of the four dimensions identified in the previous factorial analysis. When the variables are qualitative they are previously coded through dichotomous or polytomous variables ¹ so that they can be introduced in the model (see table below).

Table 1 Variables and models analysed.

Factors	Type of variable	Categories	Acronyms
Sex	Dichotomous	Male	S = 1
		Female	S = 0
Age	Continuous	Age	A
Previous university education	Dichotomous	With experience	Eu = 1
		No experience	Eu = 0
University Qualification	Dichotomous	With qualification	T = 1
		No qualification	T = 0
Previous experience in online education	Dichotomous	With experience	Efo = 1
		No Experience	Efo = 0
Experience in university institution itself	Dichotomous	First course	I = 1
		Second and subsequent courses	I = 0
Motivation	"Continuous"	Obtain a qualification	MT
		Obtain knowledge to advance professionally	MP
		Obtain knowledge for self-improvement	ME
Academic performance	Continuous	(Credits obtained /enrolled for credits) x 100	R
Area of knowledge	Polytomous	Studying Economics of Business	EE = 1
		Studying Computer Science or Multimedia	Inf = 1
		Studying Psychology or Educational Sciences	Psi = 1
		Studying Law, Humanities or Philology	Ref. Cat.
Type of connection	Polytomous	Telephone	Tf = 1
		ADSL	AD = 1
		RDSI, cable and other type connection	Ref. Cat.
Location of connection	Dichotomous	Home	L = 1
		Not home (work, others)	L = 0
Price	Dichotomous	Non subsidised	P = 1
		Subsidised	P = 0

In order to analyse the effect of each one of these variables – for example, variable X – on the global level of perceived quality and the interaction that takes place between each one of the dimensions and the variable studied, a model has been calculated that is expressed thus:

$$\text{Model to calculate: } PSQ_i = \beta_0 + \beta_1 D_{1i} + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + \beta_5 X_i + \beta_6 X_i D_{1i} + \beta_7 X_i D_{2i} + \beta_8 X_i D_{3i} + \beta_9 X_i D_{4i} + \epsilon_i$$

A stepwise regression analysis is applied in order to calculate this model. One of the main reasons that justify the application of this procedure is that multicollinearity may exist among the variables – especially derived from introducing variables with multiplicative effect in the regression equation –, and in

¹ The additive effect or influence consists of adding a fictitious variable to the model, in order to analyse how the constant term varies when considering the attribute to which the variable in question refers. The multiplicative influence consists of introducing a fictitious variable by multiplying another exogeneous variable of the model, observing whether a change takes place in the slope of the endogeneous variable (Artis and Guillén, 1998).

the presence of possible multicollinearity problems the hierarchical or stepwise procedures are more appropriate (Etxebarria, 1999; p. 87).²

The data used to contrast the hypotheses were provided by 1,870-degree students of the Open University of Catalonia, in response to a survey sent out in June 2004. The sample was made up of the following types of students: 50% of the students are women, 45.6% are younger than 36 and 22.4% are studying their first semester at the UOC. In addition, 37.5% are taking an Economics and Business study programme, 18.1% Computer Science and Multimedia and 15% Psychology and Educational Sciences. Regarding the type and location of the connection, 85% connect from home and only 13% connect from work. Also, 58% use ADSL to connect to the UOC and 28%, a standard telephone line.

4.- Conclusions

Once the validity of the estimated linear regression models was verified,³ the main conclusions obtained were as follows:

Table 2 Results of contrast of hypothesis.

Hypothesis	Factors	Influence on PSQ					Estimated model (*)
		Direct	Indirect				
			D ₁	D ₂	D ₃	D ₄	
H1	Sex	...	...	...	...	(+)	$PSQ_e = 4,036 + 0,332D_1 + 0,217D_2 + 0,148D_3 + [0,172 + 0,047S]D_4$
H2	Age	(+)	(+)	...	...	...	$PSQ_e = 3,924 + [0,206 + 0,003A]D_1 + 0,203D_2 + 0,148D_3 + 0,186D_4 + 0,003A$
H3	University educat. experience	(-)	...	...	...	...	$PSQ_e = 4,099 + 0,333D_1 + 0,215D_2 + 0,148D_3 + 0,193D_4 - 0,075Eu$
H4	University qualific.	...	...	...	...	...
H5	Previous experience in online education	(-)	...	...	(+)	...	$PSQ_e = 4,052 + 0,332D_1 + 0,214D_2 + [0,131 + 0,072Efo]D_3 + 0,193D_4 - 0,06Efo$
H6	Experience in the institution itself	...	...	...	...	...
H7	Motivation	(+)	...	...	...	...	$PSQ_e = 3,719 + 0,321D_1 + 0,212D_2 + 0,193D_4 + [0,038 + 0,033D_3]MP + 0,034ME$
H8	Academic perform.	...	...	...	...	...
H9	Area of knowledge	(+)	...	...	(+)	...	$PSQ_e = 4,024 + 0,333D_1 + 0,218D_2 + [0,127 + 0,054EE]D_3 + 0,196D_4 + 0,073Psi$
H10	Type of connection	...	...	...	(-)	(+)	$PSQ_e = 4,036 + 0,332D_1 + 0,217D_2 + [0,172 + 0,047AD] + [0,172 + 0,047AD]D_4$
H11	Location of connect.	...	...	...	...	...
H12	Price	(-)	(+)	...	...	...	$PSQ_e = 4,054 + [0,315 + 0,056P]D_1 + 0,216D_2 + 0,142D_3 + 0,196D_4 - 0,073P$

Notes. D₁: Essential service. D₂: Auxiliary services. D₃: Complementary services. D₄: User interface.

(*) When there is not significant influence: $PSQ_e = 4,037 + 0,332D_1 + 0,218D_2 + 0,148D_3 + 0,195D_4$

(+) Positive influence. (-) Negative effect. "..." No significant influence.

- Hypothesis H1 is partially confirmed: *the students' sex does not have any direct influence on the perceived service quality. Nonetheless, a mediated effect through the user interface has been found, since a modification in this dimension produces a greater variation in the PSQ of men rather than of women.*

² This regression equation is calculated by using the SPSS statistic package. Indeed, of the diverse methods available in this software, the stepwise procedure is applied because it is the most comprehensive and provides the most information, since it allows us to obtain the entry sequence of the variables in the equation, indicating at each stage the regression equation statistics obtained (Etxebarria, 1999; p. 89).

³ The absence of atypical values and points of influence has been confirmed, as well as the assumptions of linearity, independence, homocedasticity, normality and absence of a level of significant multicollinearity. The level of significance considered was 95%.

- *The existence of a positive direct and indirect relation between the age of the students and the level of perceived service quality* is confirmed (Hypothesis H2). Thus: the older the students, the more likely they are to: a) perceive a higher level of service quality and, b), attach more relative importance to the essential service, namely, the teaching and the development of their own learning process.
- Hypothesis H3 is partially confirmed. *An effect on the level of perceived service quality is noted in students who have previously taken a university course* – in this case, negatively, that is, lowering it. Nonetheless, previous university experience does not have any indirect influence – through the dimensions – on the perceived service quality.
- *Previous experience in online education makes students attach a greater relative importance to support and complementary services*, and, furthermore, *they feel that the service presents a lower level of quality*,⁴ thereby confirming hypothesis H5.
- Hypothesis H4 and H6 are rejected, as the *PSQ is neither directly nor indirectly affected by prior possession of a university qualification, nor by the student's experience in the university institution itself*.
- Hypothesis H7 is confirmed and, as such, the level of *perceived service quality varies in accordance with student motivation*. Hence, a significant positive effect is established between the PSQ level and student motivation, whether this is understood as a desire to earn a degree, to acquire knowledge that will contribute to his/her professional advancement, or merely for self-improvement, irrespective of professional development. This influence is more apparent in the latter two cases. Additionally, when the main learning motivation of students is professional advancement, the dimension linked to the complementary services becomes solely a joint effect with this type of motivation.
- Hypothesis H8 is rejected. No significant evidence is found to support the hypothesis that *the perceived service quality depends directly or indirectly on the student's academic performance*.
- It has been corroborated that *the programme's field of knowledge has a direct and indirect influence on the perceived quality service* (H9). Hence, in relation to the reference category, it was verified that students in the area of Educational Sciences and Psychology have a higher level of PSQ and students in the area of Economics and Business attach a higher relative importance to the complementary services.
- Hypothesis H10 is partially rejected, by virtue of the fact that *the perceived service quality depends directly and indirectly on the type of Internet connection used by the student*. Although the type of connection used does not have a direct effect on the level of PSQ, it has been established that it does affect the relative importance that the students attach to the different dimensions of the quality. Thus, those using an ADSL connection compared with those using any other type of connection (excluding the standard telephone line), lend greater relative importance to the user interface dimension and give less importance to the complementary services.
- Hypothesis H11 is rejected, given that no significant relation has been detected *between the perceived service quality and the location of the student's Internet connection*.
- Hypothesis H12 is accepted and, therefore, we can confirm that *the perceived service quality depends directly and indirectly on the cost of the studies*. In doing so, it is observed, in agreement with the conclusions obtained in other studies (*vid.* for instance, Jarvenpaa and Todd, 1997; Mittal *et al.*, 1998; Bolton and Lemon, 1999), that students that pay higher fees are more demanding: they perceive a lower level of PSQ and, at the same time, give more importance to the dimension relating to the central service – the teaching.

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⁴ In general, older students appear to perceive the level of PSQ more positively, possibly because, as was contrasted in a previous qualitative analysis, they feel satisfied merely due to gaining access to a type of education that allows them to combine their professional and family responsibilities with their learning. This circumstance is strengthened by the fact that the greater the student's experience in online university education, the more demanding they appear to be.

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